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ABSTRACT

Over a period of three years, the National Consortium for Humanizing Education worked with teachers and students in two states to test hypotheses drawn from a model in which student outcomes (including good mental health) were seen as the results of a learning process occurring between individuals rather than as the product of an institutionalized situation. In this model, mental health is assumed to be learned in much the same way that other capabilities are learned; that is, as the result of an interdependent interpersonal interactive process. The goal of the applied research program was to devise, demonstrate, and document Interpersonal Skills Training for Teachers. This summary document presents an overview of the total project, and discusses 15 basic studies. Conclusions from each of the studies indicate an over-all effectiveness of the Interpersonal Skills Training for Teachers. (Author/PC)

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RESEARCH SUMMARY: EFFECTS OF TRAINING IN INTERPERSONAL SKILLS

Interim Report No. 4
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by

D. N. Aspy
F. N. Roebuck

NATIONAL CONSORTIUM FOR HUMANIZING EDUCATION

SKILLS TRAINING FOR HUMAN GROWTH

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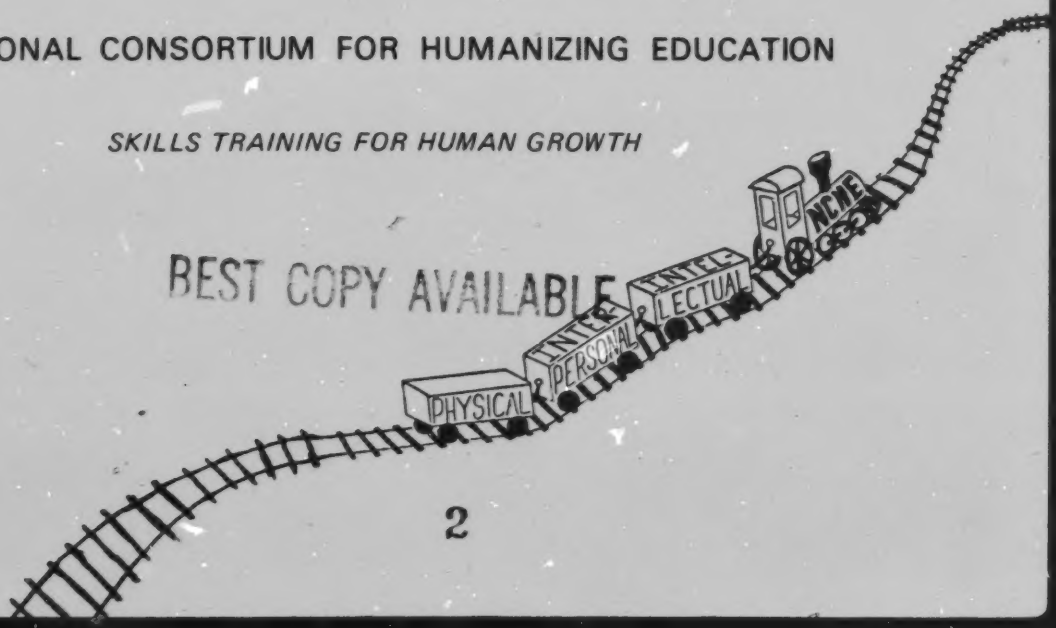

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NATIONAL CONSORTIUM FOR HUMANIZING EDUCATION
Northeast Louisiana University
Monroe, Louisiana

1974

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At this crescendo moment when presenting the final outcomes from three years total involvement with the National Consortium for Humanizing Education, it seems appropriate to turn both inward and outward to consider once again those who gave us life and those who fostered a dream. Although we owe a debt of gratitude to literally hundreds of people who worked with us during the last three years, the ultimate debt is to three sets of people. The first two sets are our respective parents, William L. Aspy, Sr., and Mary Frances Clark Aspy and Delmus Alphonso Roebuck and Ila Mae Bost Roebuck, who gave us life and directed our growth. The third group are the people at NIMH who made it possible for our dream to become a reality. Within this set, particular thanks are owed to Dr. Joseph Wright Griggs and Dr. Joseph Marches for their continuing support and communication throughout the life of the project.

David N. Aspy
Flora N. Roebuck

TABLE OF CONTENTS

	Page
List of Figures and Illustrations	ix
List of Tables	x
PART I -- OVERVIEW	1
Overview	3
Statement of Problem	3
Research Questions	4
Design	6
Statistical Treatment	6
Samples	6
Study Variables	7
Procedures for Assessing Tape Data	20
PART II - PRESENTATION OF BASIC STUDIES	25
Study 1: Results of Multilinear Regression Analysis Using Principal Behavior to Predict Teacher Behavior.	27
Study 2: Kruskal-Wallis One-Way Analysis of Variance by Ranks of Teacher Self-Report Data	43
Study 3: Grade-Level Contributions to the Variation of Flanders' Interaction Analysis Categories	49
Study 4: Grade-Level Contributions to the Variation of Cognitive Functioning Categories	61
Study 5: Subject Matter Contributions to the Variance of Classroom Functioning Variables	70

Page

Study 6: Sixth-Degree Orthogonal Polynomial Multilinear Regression Analysis for Trends Across Time Among Classroom Functioning Variables 77

Study 7: Relationships Between Pre-Test Standing on Classroom Functioning Variables and Teacher Characteristics of Race, Sex, and Years of Teaching Experience 91

Study 8: Correlation of Classroom Runctioning Variables with Teacher's Level of Physical Functioning 99

Study 9: Response Surface Analysis 103

PART III - PRESENTATION OF APPLIED RESEARCH STUDIES. . 117

Study 10: Analysis of Co-Variance for Differences Between Treatment Post-Test Means of Classroom Functioning Variables . . . 119

Study 11: Effects of Teacher Characteristics of Sex, Race, or Years of Teaching Experience on Post-Test Means of Classroom Functioning Variables 140

Study 12: Relative Effectiveness of Three Versions of Interpersonal Skills Training . . . 145

Study 13: Effect of Prior Training of School Principal on Teacher Response to Interpersonal Skills Training 149

Study 14: The Classroom Functioning Variables as Predictors of Change on Student Outcome Measures of Absenteeism, Self-Concept, and Achievement 153

Study 15: Analysis of Co-Variance of Change on Outcome Measures by Experimental and Control Students 169

PART IV - SUMMARY AND IMPLICATIONS FOR PRACTICE AND RESEARCH 183

Model Tested 185

Integration of Research Findings 187

Page

Student Presage Characteristics 187

Teacher Presage Characteristics 187

Contexts of Learning Interaction 188

Inter-Relationships of Teacher and Student Behavior within Learning Interactions 190

NCHE Intervention 192

Student Outcomes 197

Results Related to Model 198

Statistical Treatment 199

Implications for Practice 200

Teacher Training 200

Adapting the Methodology to Personnel Selection 205

Implications for Further Research 206

Implications Beyond the Educational Context . . . 208

APPENDIX -- Research Instruments 211

Flanders' Categories for Interaction Analysis 213

Cognitive Functioning Categories 214

A Scale for the Measurement of a Teacher's Understanding of the MEANING of Classroom Experiences for the Students 215

A Scale for the Measurement of a Teacher's GENUINENESS in Classroom Interaction with Students 217

A Scale for the Measurement of the Process of SUCCESS PROMOTION 219

A Scale for the Measurement of the RESPECT Provided by the Teacher in Classroom Interaction 221

Page

A Scale for the Measurement of STUDENT INVOLVEMENT 223

Classroom Climate Semantic Differential 225

LIST OF ILLUSTRATIONS AND FIGURES

Page

Illustration 1: Design of Study 8

Illustration 2: Model Tested with Individual Study Numbers Indicated for Variables Considered 186

Figure 1: Mean Flanders' Matrix for "Normal" Group 22

Figure 2: Mean Flanders' Matrix for Low Functioners 23

Figure 3: Mean Flanders' Matrix for High Functioners 24

Figure 4: General Forms of Commonly Occurring Significant Negative Trends in Control Group Data 81

Figure 5: Two General Forms of Commonly Occurring Significant Positive Trends in Experimental Group Data with Applications of Treatment Indicated 84

Figure 6: Response Surface for F-9 - Student Initiates at the Elementary School Level 114

Figure 7: Response Surface for F-9 - Student Initiates at the Secondary School Level 115

LIST OF TABLES

Page

Table 1: Data Base for Project After Initial Editing 9

Table 2: Distribution of Teachers within Samples by Race, Sex, Level of School, Years of Teaching Experience, and Location 10

Table 3: Distribution of Year 01 Students by Race, Sex, and Grade Level within Treatment Conditions 11

Table 4: Distribution of Year 02 Students by Race, Sex and Grade Level within Treatment Conditions 12

Table 5: Distribution of Year 03 Students by Race, Grade Level, and Sex within Treatment Conditions 13

Table 6: Individual Study N with Edit Criteria . . . 14

Table 7: Schedules of Data Collection 15

Table 8: Study Variables Assessed from Audio Tape Recordings 18

Table 9: Tape Data Base 19

Table 10: Parameters of Data -- Means and Standard Deviations of Principals' and Teachers' Scores on Study Variables 31

Table 11: Correlation of Principals' and Teachers' Scores on Same Variable 33

Table 12: Correlation Matrix of Independent Versus Dependent Variables 34

Table 13: Summary of Full Models for 25 Stepwise Multilinear Regressions of Principal Behavior as Predictor of Teacher Behavior 35

Table 14: Summary of Increase in RSQ at Entry of Variable into Model for the 22 Models Constructed 37

Page

Table 15: Selected Regression Equations 38

Table 16: School Means for MTAI and SD Variables by Groups 45

Table 17: Summary of Kruskal-Wallis One-Way Analysis of Variance by Ranks for 19 Teacher Perception Variables 46

Table 18: Unadjusted Flanders' Means by Grade Level 50

Table 19: Tests of Significance for Computed F's of One-Way Analysis of Variance of the Grade Level Means of the Concomitant Variables 53

Table 20: Tests of Significance for Computed F's of 10 One-Way Analyses of Variance for Grade Level Effects on Flanders' Categories with Sources of Significance Indicated 55

Table 21: Tests of Significance for Computed F's of 10 One-Way Analyses of Co-Variance for Grade-Level Effects on Flanders' Categories with Genuineness and Respect as Concomitant Variables (Series One) 56

Table 22: Tests of Significance for Computed F's of 10 One-Way Analyses of Co-Variance for Grade-Level Effects on Flanders' Categories with Success Promotion and MTAI as Concomitant Variables (Series Two) 58

Table 23: Unadjusted Cognitive Means by Grade Level 62

Table 24: Tests of Significance for Computed F's of 10 One-Way Analyses of Variance for Grade-Level Effects on Cognitive Functioning Categories with Sources of Significance Indicated 65

Table 25: Tests of Significance for Computed F's of 10 One-Way Analyses of Co-Variance for Grade Level Effects on Cognitive Categories with Respect and MTAI as Concomitant Variables 66

Page

Table 26: Significance Levels Less Than .10 by Sources of Variation for 25 Two-Way Analyses of Variance by Grade and Subject Matter for Classroom Functioning Variables 71

Table 27: Means for Variables in which Significant Differences by Grade, Subject Matter, or GxT Interactions were Detected 72

Table 28: Rank Order of Means for Significant Grade by Subject Matter Interactions 73

Table 29: Teacher Sample for Trend Analysis by Grade Level Groups within Treatment Conditions 78

Table 30: Significant Components of the Polynomial Expressions for Significant Trends Detected in Control Group Data 80

Table 31: Significant Components of the Polynomial Expression for Significant Trends Detected in Experimental Group Data 83

Table 32: Summary of 6-Degree Polynomial Multilinear Regression Analysis Across Time -- Direction and Treatment Assignment of Significant Behavior Trends for 200 Paired Analyses of Experimental and Control Grade-Level Groups 86

Table 33: Summary of Favorable Versus Unfavorable Comparisons of Experimental Group Trends with Control Group Trends 87

Table 34: Significance Levels Less than .05 by Sources of Variation for 25 Analyses of Variance by Sex, Race, and Years of Teaching Experience for Classroom Functioning Variables 93

Table 35: Means for Sex and Race Groups for Variables in which Significant Differences by Sex or Race were Detected 94

Table 36: Means for Teaching Experience Groups for Variables in which Significant Differences by Years of Teaching Experience were Detected . . 95

Page

Table 37: Correlation Coefficient for Harvard Step-Test Score with Pre-Test Scores of 25 Classroom Functioning Variables for Elementary and Secondary Teachers 101

Table 38: Data Base for Response Surface Analysis 104

Table 39: Stability of Predictability of Study Variables from Sample to Sample within School Levels 107

Table 40: Recurring Predictive Variables 108

Table 41: Summary of Predictive Appearances of Recurring Variables 109

Table 42: Distribution of Teachers by Grade-Level and Treatment Condition for Three Samples 121

Table 43: Significance Levels Less Than .10 by Source of Variation for 25 Analyses of Co-Variance of Grade-Level and Treatment Means of Classroom Functioning Variables for Year 01 Teachers in Grades 1 - 12 123

Table 44: Significance Levels Less Than .10 by Source of Variation for 25 Analyses of Co-Variance of Grade-Level and Treatment Means on Classroom Functioning Variables for Year 02 Teachers in Grades 1-12 125

Table 45: Significance Levels Less Than .10 by Source of Variation for 25 Analyses of Co-Variance of Grade-Level and Treatment Means on Classroom Functioning Variables for Year 02 Teachers in Grades 1-6 126

Table 46: Significance Levels Less Than .10 by Source of Variation for 25 Analyses of Co-Variance of Grade-Level and Treatment Means of Classroom Functioning Variables for Two-Year Teachers (Cumulative Differences) in Grades 1-12 128

Table 47: Significance Levels Less Than .10 by Source of Variation for 25 Analyses of Co-Variance of Grade-Level and Treatment Means of Classroom Functioning Variables for Two-Year Teachers (Cumulative Differences) in Grades 1-6 129

Page

Table 48: Significance Levels Less Than .10 by Source of Variation for 25 Analyses of Co-Variance of Grade-Level and Treatment Means on Classroom Functioning Variables for Year 03 Teachers in Grades 1-12 130

Table 49: Significance Levels Less Than .10 by Source of Variation for 25 Analyses of Co-Variance of Grade-Level and Treatment Means on Classroom Functioning Variables for Year 03 Teachers in Grades 1-6 132

Table 50: Chi-Square Statistics for Number of Means Associated with Expected Direction of Treatment Benefit for Teachers at All Grade Levels 1-12 133

Table 51: Magnitude of Change in Experimental Teacher Behavior with 27 Hours of Training in Interpersonal Skills over a 2-year period . . 135

Table 52: Distribution of Experimental Teachers by Sex, Race and Years of Teaching Experience within Three Samples 140

Table 53: Significance Levels Less Than .05 by Source of Variation for 75 Analyses of Co-Variance for Sex, Race, and Teaching Experience Effects on the Classroom Functioning Variables with Pre-Test as Covariate 142

Table 54: Significance Levels Less Than .05 by Source of Variation for 25 Analyses of Co-Variance for Program and Year Effects on the Classroom Functioning Variables with Pre-Test as Covariate 143

Table 55: Significance Levels Less Than .05 by Source of Variation for 25 Analyses of Co-Variance for Grade-Level and Treatment Effects on Classroom Functioning Variables with Pre-Test as Covariate 150

Table 56: Distribution of Sample for Study 14 by Grade Level 154

Table 57: Results of Multilinear Regression Analysis -- Variation (R^2) in Adjusted* Mean Gain Predicted by Teacher Behavior Factors 157

Page

Table 58: Percent of Equations for Category in Which Variable Appears as a Significant Predictor of Gain 159

Table 59: Percent of Total Predictive Appearances in Category by Variable Clusters for School Level 161

Table 60: Percent of Predictive Appearances in Category by Variable Cluster Per Level that is Accounted for by Stability of Teacher Functioning Factors 162

Table 61: Proportion of Predictive Appearances in Category by Variable Cluster per level that is Accounted for by Stability of Teacher Functioning Factors 163

Table 62: Significance Levels Less Than .05 Detected Between Treatment Means of Adjusted Change on 12 Outcome Measures for Year 01 Students 170

Table 63: Significance Levels Less Than .05 Detected Between Treatment Means of Adjusted Change on 12 Outcome Measures for Year 02 Students 171

Table 64: Significance Levels Less Than .05 Detected Between Treatment Means of Adjusted Change on 11 Outcome Measures for Year 03 Students 172

Table 65: Summary of Tables 62, 63, 64 177

Table 66: Percent of Significant Analyses in Favor of Experimental Group 178

Table 67: Adjusted Treatment Means for Variables and Grade Levels in which Significant Differences ($p < .05$) were Detected in Year 02 Student Data 180

Table 68: Adjusted Treatment Means for Variables and Grade Levels in which Significant Differences ($p < .05$) were Detected in Year 02 Student Data 181

Page

Table 69: Normative Data for Classroom Functioning Variables -- Means from 1,951 One-Hour Audio Tape Recordings of Instruction Submitted by Control Teachers in Texas from May, 1971 to May, 1973 and in Louisiana from September, 1973 to April, 1974 194

PART I

OVERVIEW

OVERVIEW

Statement of Problem

The goal of the applied research program conducted over a three year period by the National Consortium for Humanizing Education was to devise, demonstrate, and document (the effects of) Interpersonal Skills Training for Teachers. Hypotheses of the project were:

1. Teachers can be trained to increase the levels of facilitative interpersonal conditions[1] which they offer to their students.

2. It is feasible to provide Interpersonal Skills Training for large numbers of teachers.

3. Increases in the levels of facilitative interpersonal conditions provided by teachers will be accompanied by changes in pupil outcomes indicative of gains in both (a) indices of mental health and (b) cognitive indices.

In carrying out the project to reach the above goal and test the hypotheses set forth, major activities of the NCHE were:

1. To devise a training program in Interpersonal Skills for teachers,

2. To carry out the training program with a substantial number of teachers,

3. To conduct research into the effects of the training program on (a) changes in teacher classroom functioning and (b) student outcomes.

---

[1] Carl R. Rogers. "The Interpersonal Relationships in the Facilitation of Learning." In Robert R. Leeper (ed.), Humanizing Education: The Person in the Process. (Washington, D.C.: Association for Supervision and Curriculum Development, NEA), 1969.

All activities have been completed. The development of the training program was described and the final product displayed in Interpersonal Skills Training for Teachers.[2]

This report completes the presentation of the research results. Two prior reports were also concerned with research. Maintaining Reliability in a Longitudinal Study[3] presented reliability statistics and documented the procedures used to maintain rate-rerate reliability across a three year period. Response Surface Analysis[4] exhibited the results of 150 backward elimination multilinear regression analyses examining inter-relationships of teacher and student behavior study variables.[5]

Research Questions

As an applied research project, the primary goal of the NCHE was to seek answers to these six questions:

1. Did the experimental treatment (Interpersonal Skills Training for Teachers) make a difference in teacher behavior? (Study No. 10)*

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[2] Aspy, D. N.; Roebuck, F. N.; Willson, M. A.; and Adams, O. B. Interpersonal Skills Training for Teachers: Interim Report #2. Monroe, LA: National Consortium for Humanizing Education, Northeast Louisiana University (National Institute of Mental Health Research Grant No. 5 PO 1 MH 19871), 1974.

[3] Roebuck, F. N.; Aspy, D. N.; Sadler, L. L.; and Willson, M. A. Maintaining Reliability in a Longitudinal Study: Interim Report #1. Monroe, LA: National Consortium for Humanizing Education, Northeast Louisiana University (National Institute of Mental Health Research Grant No. 5 PO 1 MH 19871), 1974.

[4] Roebuck, F. N. and Aspy, D. N. Response Surface Analysis: Interim Report #3. Monroe, LA: National Consortium for Humanizing Education, Northeast Louisiana University (National Institute of Mental Health Research Grant No. 5 PO 1 MH 19871), 1974.

[5] The Study variables are defined below, pp. 8 ff.

*The Study numbers in parentheses refer to the order in which the studies are presented in this report.

2. Was the teacher's response to training affected by teacher characteristics of race, sex, or years of teaching experience? (Study No. 11).

3. Were revised training procedures more effective than the original procedures? (Study No. 12).

4. Were training effects enhanced when the principal of the school had received prior training in Interpersonal Skills? (Study No. 13).

5. Were teacher behavior study variables related to student outcomes on indices of mental health and cognition? (Study No. 14).

6. Did the experimental treatment (Interpersonal Skills Training of Teachers) translate to differences in student outcomes on indices of mental health and cognition? (Study No. 15).

However, because this was action research in a natural (field) setting, there were additional questions of a basic research nature which needed to be answered in order to ensure proper consideration of confounding variables and to aid in the interpretation of results from the applied research studies. Accordingly, the following additional questions were posed:

7. Is there a relationship between the behavior of the school principal and the response on the study variables by the teachers in his school? (Study No. 1).

8. Is there a relationship between the school principal's over-all level of Interpersonal Functioning and the way in which the teachers in his school perceive their working environment and instructional tasks? (Study No. 2).

9. Are there grade level effects on the teacher behavior study variables? (Study No. 3 and 4).

10. Are there subject matter effects on the teacher behavior study variables? (Study No. 5).

11. Are the teacher behavior study variables affected by time of year? (Study No. 6).

12. Were initial levels of the teacher behavior study variables related to teacher characteristics of race, sex, or years of teaching experience? (Study No. 7).

13. Is there a relationship between the level of physical functioning of the teacher and the teacher behavior study variables? (Study No. 8).

14. Are there relationships among the study variables of teacher and student classroom functioning? (Study No. 9).

Each of the above questions was formulated as a null hypothesis capable of being tested statistically within the design of the project. Parts II and III of this report present the results of the individual studies and Part IV summarizes and integrates the findings.

DESIGN

Statistical Treatment

The research was conducted in what was essentially a two-group pretest-posttest design, although process measures of classroom functioning were taken periodically in both control and experimental groups. Illustration 1 displays the variations in design for the three year period.

The data collected included both instrumental scores and behavioral indices. (For specifics, see the discussion of study variables below). The statistical procedures for treatment of the obtained data included:

1. Sixth-Degree orthogonal polynomial multilinear regression analysis across time,

2. Backward elimination multilinear regression analysis with quadratic terms,

3. Stepwise multilinear regression analysis,

4. Analysis of co-variance of gains between groups,

5. Analysis of variance of group means,

6. Chi-Square analysis of contingency tables,

7. Kruskal-Wallis one-way analysis of variance by ranks.

Samples

The teachers involved in the Year 01 (1971-72 school year) and Year 02 (1972-73) samples were "informed consent" participants from eight elementary schools, two junior high

schools, and two senior high schools in a large city in north-central Texas. The schools represented all socio-economic levels and racial distributions in the city. The teachers in the Year 03 (1973-74) sample were "informed consent" participants from ten schools in a rural and suburban parish in northeastern Louisiana. They represented all but one of the schools in the Parish.

The numbers in Illustration 1 represent the actual number of individuals who participated to the extent of supplying one or more items of data. After initial editing each year, the data base was reduced to the levels displayed in Table 1. In this initial edit, adult participants were retained if they had (1) submitted 3 or more tapes during the year and (2) completed the Professional Information sheet supplying socio-demographic data. Student data was edited on the basis of mobility; i.e., students were retained who had taken both pre and post tests on at least one index. Table 2 displays the distribution of the teachers in the three samples by race, sex, school level, and years of teaching experience. Tables 3, 4, and 5 present the distribution of the students within treatment conditions by race, sex, and grade level.

A further edit occurred as each study was conducted. Table 6 displays the gross N and editing criteria for each study and its replications, if any. Sub-group N's for each study will be presented as the studies are described.

Study Variables

Data was collected from students, teachers, and principals of the participant schools. The data obtained from the three kinds of participants is discussed separately below.

Student Indices: Table 7 lists the data collected from each student in the study and the schedule of data collection. The achievement tests and self-concept instruments were administered by the classroom teacher utilizing machine-scorable forms which were scored by the publisher. Absentee data was supplied by the school system's central data processing unit and was taken from the official records kept for purposes of determining state aid. Socio-demographic data was also supplied for each student.

Teacher Data: Each year, the teacher participants were administered pre and post tests on the Minnesota Teacher Attitude Inventory and the School Climate Semantic Differential.[6] The

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[6]This instrument was developed by Southeastern Educational Development Laboratory and yields scores on 17 aspects of school climate. For further details about the instrument see Study No. 2, p. 27 ff.

Illustration 1: Design of Study

Project Year 01

	EXP	CON
Grades 7-12	2	2
Grades 1-6	4	4

Site: Urban Texas
Treatment: E-1

Sample:

12 schools
309 teachers
7,408 students

Project Year 02

	EXP		CON	
Grades 7-12	2		1	
	EE	CE*	CC	EC+
Grades 1-6	3	1	3	1

Site: Urban Texas
Treatments: E-2 and E-1 revised

Sample:

11 schools
230 teachers
4,200 students

Project Year 03

	EXP	CON
Grades 7-12	2	2
Grades 1-6	4	2

Site: Rural Louisiana
Treatment: E-2 Revised

Sample:

10 schools
136 teachers
2,922 students

Treatment E-1 - Process Skills training only
Treatment E-2 - Process & Application Skills training

*Control school rotated to Experimental condition; received Treatment E-1 revised.

+Experimental school rotated to No Training (Control) condition.

Table 1: Data Base for Project
After Initial Editing

Participants	Year 01	Year 02	Year 03
Number of Schools	12	11	10
Number of Principals*	11	10	6
Number of Teachers	272	205	104
Number of Students	6,412	3,759	2,401

*There are fewer principals than schools because not all principals submitted the three tapes requested.

Table 2: Distribution of Teachers within Samples by Race, Sex, Level of School, Years of Teaching Experience, and Location

	Classification	Samples		
		Yr. 01	Yr. 02	Yr. 03
Race	Total Black American	66	48	38
	Total White American	203	154	65
	Total Other	3+	3+	1*
Sex	Total Male	40	21	15
	Total Female	232	184	89
Sex & Race	Black Males	13	7	6
	White Males	27	14	9
	Black Females	53	41	32
	White Females	176	140	56
	Other Females	3+	3+	1*
Level	Elementary (grades 1-6)	168	142	59
	Secondary (grades 7-12)	104	63	45
	Total (grades 1-12)	272	205	104
Teaching Experience	1 Yr. Experience	25	24	19
	2 Yrs. Experience	23	14	14
	3-7 Yrs. Experience	54	35	30
	8-15 Yrs. Experience	68	48	20
	16-25 Yrs. Experience	60	49	14
	Over 25 Yrs. Experience	42	35	7
Location		Urban Texas	Urban Texas	Rural LA.

+Sample included 1 American Indian Female, 1 Mexican-American Female, and 1 Oriental Female.

*Sample included 1 Mexican-American Female.

Table 3: Distribution of Year 01 Students by Race, Sex, and Grade Level Within Treatment Conditions

Grade Levels	CONTROL SCHOOLS									EXPERIMENTAL SCHOOLS									ALL SCHOOLS									TOTAL		
	Black			White			Mex.Am.			Black			White			Mex.Am.			Black			White			Mex.Am.					
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	All
1	43	42	85	73	64	137	3	5	8	58	58	116	60	72	132	8	5	13	101	100	201	133	136	269	11	10	21	245	246	491
2	45	41	86	81	86	167	6	4	10	44	67	111	87	61	148	6	8	14	89	108	197	168	147	315	12	12	24	269	267	536
3	55	38	93	97	80	177	6	6	12	48	52	100	87	59	146	10	5	15	103	90	193	184	139	323	16	11	27	303	240	543
4	48	52	100	105	86	191	3	10	13	49	53	102	87	68	155	5	9	14	97	105	202	192	154	346	8	19	27	297	278	575
5	59	59	118	103	89	192	5	6	11	52	47	99	85	79	164	6	9	15	111	106	217	188	168	356	11	15	26	310	289	599
6	35	38	73	98	91	189	7	3	10	46	61	107	77	96	173	5	6	11	81	99	180	175	187	362	12	9	21	268	295	563
7	10	9	19	93	112	205	31	40	71	10	16	26	109	90	199	12	12	24	20	25	45	202	202	404	43	52	95	265	279	544
8	15	7	22	118	115	233	44	40	84	11	6	17	105	90	195	5	8	13	26	13	39	233	205	428	49	48	97	298	266	564
9	10	14	24	121	110	231	32	39	71	11	10	21	95	82	177	13	7	20	21	24	45	261	192	408	45	46	91	282	262	544
10	16	10	26	121	126	247	17	16	33	7	7	14	137	109	246	39	40	79	23	17	40	258	235	493	56	56	112	337	308	645
11	19	29	48	85	79	164	21	14	35	7	7	14	98	107	205	42	33	75	26	36	62	183	186	369	63	47	110	272	269	541
12	12	27	39	69	84	153	21	12	33	9	11	20	84	95	179	22	18	40	21	38	59	153	179	332	43	30	73	217	247	464

GRAND TOTAL: 6,609

Table 4: Distribution of Year 02 Students by Pace and Sex and Grade Level Within Treatment Conditions

	CONTROL SCHOOLS									EXPERIMENTAL SCHOOLS									ALL SCHOOLS									TOTAL		
	Black			White			Mex.Am.			Black			White			Mex.Am.			Black			White			Mex.Am.					
Grade Levels	M	F	Total Black	M	F	Total White	M	F	Total MexAm	M	F	Total Black	M	F	Total White	M	F	Total MexAm	M	F	Total Black	M	F	Total White	M	F	Total MexAm	M	F	ALL
1	31	12	43	62	67	129	9	7	16	38	30	68	25	21	46	0	0	0	69	42	111	87	88	175	9	7	16	165	137	302
2	28	32	60	73	80	153	7	5	12	39	38	77	19	17	36	1	0	1	67	70	137	92	97	189	8	5	13	167	172	339
3	36	32	68	97	90	187	8	6	14	22	33	55	21	18	39	20	26	46	58	65	123	118	108	226	28	32	60	204	205	409
4	24	18	42	90	66	156	6	5	11	41	43	84	21	19	40	2	2	4	65	61	126	111	85	196	8	7	15	184	153	337
5	9	17	26	69	57	126	1	6	7	65	62	127	24	19	43	0	2	2	74	79	153	93	76	169	1	8	9	168	163	331
6	37	37	74	81	82	163	5	6	11	49	46	95	22	14	36	1	2	3	86	83	169	103	96	199	6	8	14	195	187	382
7	--	--	--	--	--	--	--	--	--	10	8	18	41	46	87	3	3	6	10	8	18	41	46	87	3	3	6	54	57	111
8	--	--	--	--	--	--	--	--	--	8	14	22	97	66	163	9	9	18	8	14	22	97	66	163	9	9	18	114	89	203
9	--	--	--	--	--	--	--	--	--	11	5	16	82	70	152	4	5	9	11	5	16	82	70	152	4	5	9	97	80	177
10	0	1	1	48	54	102	4	2	6	12	12	24	102	96	198	21	28	49	12	13	25	150	150	300	25	30	55	187	193	380
11	12	7	19	87	96	183	13	6	19	6	5	11	110	87	197	23	29	52	18	12	30	197	183	380	36	35	71	251	230	481
12	11	24	35	57	62	119	13	9	22	6	7	13	30	75	155	25	24	49	17	31	48	137	137	274	38	33	71	192	201	393

GRAND TOTAL: 3,845

Table 5: Distribution of Year 03 Students by Race, Grade-Level and Sex within Treatment Conditions

	Control Schools						Experimental Schools						All Schools								
	BLACK			WHITE			BLACK			WHITE			BLACK			WHITE			TOTAL		
Grade Levels	M	F	Tot. Bl.	M	F	Tot. Wh.	M	F	Tot. Bl.	M	F	Tot. Wh.	M	F	Tot. Bl.	M	F	Tot. Wh.	M	F	Tot. All
1	34	29	63	35	34	69	31	27	58	32	29	61	65	56	121	67	63	130	132	119	251
2	24	25	49	23	30	53	13	18	31	30	10	40	37	43	80	53	40	93	90	83	173
3	10	8	18	13	15	28	32	24	56	32	26	58	42	32	74	45	41	86	87	73	160
4	17	13	30	23	24	47	37	35	72	32	28	60	54	48	102	55	52	107	109	100	209
5	13	18	31	20	19	39	33	42	75	46	36	82	46	60	106	66	55	121	112	115	227
6	16	11	27	18	20	38	47	49	96	45	38	83	63	60	123	63	58	121	126	118	244
7	19	9	28	29	17	46	22	22	44	43	34	77	41	31	72	72	51	123	113	82	195
8	25	38	63	25	28	53	29	35	64	40	47	87	54	73	127	65	75	140	119	148	267
9	24	17	41	5	27	32	2	10	12	3	7	10	26	27	53	8	34	42	34	61	95
10	18	29	47	15	34	49	5	9	14	5	13	18	23	38	61	20	47	67	43	85	128
11	19	21	40	21	9	30	8	12	20	3	10	13	27	33	60	24	19	43	51	52	103
12	15	23	38	13	15	28	5	14	19	1	10	11	20	37	57	14	25	39	34	62	96

GRAND TOTAL: 2,148

Table 6: Individual Study N with Edit Criteria

	Study Number	Year 01	Year 02	Year 03	Edit Criteria
BASIC STUDIES	1	250	--	--	4 tapes submitted; school principal's co-operation
	2	257	--	--	SD and MTAI pre-tests
	3	238	--	--	5 tapes; MTAI pre-test
	4	238	--	--	5 tapes; MTAI pre-test
	5	89	--	--	Secondary teachers; tape for March, 1972
	6	234	--	--	6 tapes including September, 1971 and May, 1972 tapes
	7	121	--	--	Experimental teachers; 4 tapes including May, 1971 and May, 1972
	8	--	--	46	Experimental teachers; September, 1973 tape; Harvard Step-Test
	9	260	192	99	5 tapes submitted during year
APPLIED STUDIES	10	240	155	87	4 tapes each year including pre-post; if experimental, completed training
	11	121	52	41	Experimental teachers; 4 tapes including pre-post; completed training
	12	86	41	--	Experimental teachers grades 1-6; pre-post tapes; completed training
	13	--	--	47	Teachers grades 4-8; pre-post tapes; if experimental, completed training
	14	156 5,003*	--	--	Classroom teachers; 4 or more tapes; Secondary teachers restricted to English & Math; their students
	15	5,796*	2,726*	2,138*	Students of participating teachers; took pre-post tests

-- Study Not Replicated.
* Student N

Table 7: Schedules of Data Collection

A. Student Outcome Indices

Measures:	Nov. 71	April 72	May 72	Oct. 72	April 73	May 73	Oct. 73	April 74
How I See Myself Tests	X	X		X	X		X	X
Achievement Tests	X	X		X	X		X	X
Attendance Data			X			X		
Socio-Demographic Data		X			X			X

B. Data from Teachers and Principals

Measures:	May 71	Aug. 71	Sept. 71	May 72	Sept. 72	May 73	Sept. 73	April 74
Minnesota Teacher Attitude Inventory		X		X	X	X	X	X
Classroom Climate Semantic Differential		X		X	X	X	X	X
Personal and Professional Information			X		X		X	
Audio Recordings of Classroom Instruction	X		X—*—X		X—*—X		X—*—X	
Audio Recordings of Principal/Teacher Interaction			X—+—X		X—+—X		X—+—X	

*At Monthly Intervals

+Three Times a Year

pre-test was administered by an NCHE trainer during teacher "work days" prior to school opening in the fall and the post-test was administered in May. (See Table 7). Each teacher also filled out a Professional Information sheet supplying data on her current work assignment, her professional preparation, and personal information. The Minnesota Teacher Attitude Inventory (MTAI) and the Semantic Differential (SD) were scored at the NCHE offices.

The study variables of major interest to the NCHE researchers were those derived from the audio tape recordings of classroom interaction supplied by the teachers. Each teacher recorded one continuous hour of instruction during a designated week each month during the school year. The teachers had been directed to teach in their normal manner. These audio recordings were forwarded to the National Consortium for Humanizing Education where they were coded for teacher and student behaviorial variables by teams of trained raters who maintained interrater reliabilities of above .90.[7]

The raters applied three instruments in their coding of the recordings. The first instrument is a set of 5 Process Scales[8] adapted from Carkhuff[9] which utilize the teacher's vocal tone, choice of emotion words, and selected portions of the communication pattern to measure the level of interpersonal skills exhibited in verbal interaction. (See Appendix for copies of the scales). Each scale defines five levels from 1.0 to 5.0 with intermediate ratings beyond the decimal point; e.g., 1.3 or 4.7. In effect, then, each is applied as a 40 point scale.

The five interpersonal skills measured by the Process scales are:

1. Meaning -- the teacher's empathy or understanding of the meaning-to-the-student of his classroom experiences.

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[7] F. N. Roebuck, et al, op. cit.

[8] Aspy, D. N. Toward a Technology for Humanizing Education. Champaign, Illinois: Research Press, 1972.

[9] Carkhuff, R. R. Helping & Human Relations. Volume I (Selection and Training) and Volume II (Theory and Practice). New York: Holt, Rinehart and Winston, Inc., 1970.

2. Genuineness -- the teacher's person-to-person basis for interactions with students.

3. Success Promotion -- the degree to which the teacher promotes the student's attainment of his individual goals in moment-to-moment processes.

4. Respect -- the teacher's regard for the student as an individual with the capacity for achieving.

5. Student Involvement -- the degree to which the students are involved in and excited about their learning activities.

The raters also applied the Cognitive Functioning Categories developed by Aspy.[10] This is a time-sampling technique for measuring the frequency of occurrence of 8 categories of mental operations as they are indicated by teacher-student verbal products in the classroom. Four of these categories are for teacher products and four are for student products. The instrument further includes two categories for behavior which can not be codified as to its cognitive level. (For copy of instrument, see Appendix).

The third instrument applied, Flanders' Interaction Analysis,[11] is also a time-sampling technique which supplies the frequency of occurrence in seven categories of teacher behavior, two categories of student behavior, and one category of silence or confusion. (The instrument is displayed in the Appendix). Flanders' Interaction Analysis is the most widely known of the instruments used by the NCHE. Table 8 lists all of the tape data study variables and the symbols for each variable.

Principal data: Only tape data was obtained from the principals. Each principal supplied one-hour recordings of his faculty meetings and/or other interactions with the teachers in his school at the beginning, middle, and end of the school year. These recordings were evaluated using the same instruments as were used on the teacher tapes.

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[10] David N. Aspy, op. cit.

[11] Flanders, N. A. Teacher Influence, Pupil Attitudes, and Achievement. U. S. Department of Health, Education, and Welfare, Cooperative Research Monograph #12. Washington, D.C.: Government Printing Office, 1965.

Table 8: Study Variables Assessed from Audio Tape Recordings

Instrument	Variable Name	Abbreviation	Regression Equation Symbol
Flanders' Interaction Analysis Categories	Teacher Accepts Feelings of Student	F-1	F1
	Teacher Praises or Encourages Student	F-2	F2
	Teacher Accepts Ideas of Student	F-3	F3
	Teacher Asks Questions	F-4	F4
	Teacher Lectures	F-5	F5
	Teacher Gives Directions or Commands	F-6	F6
	Teacher Criticizes or Justifies Authority	F-7	F7
	Student Responds	F-8	F8
	Student Initiates	F-9	F9
	Silence or Confusion*	F-10	F0
Cognitive Functioning Categories	Teacher Recalls Facts	C-1	C1
	Teacher Asks for Facts	C-2	C2
	Teacher Thinks	C-3	C3
	Teacher Asks for Thinking	C-4	C4
	Student Recalls Facts	C-5	C5
	Student Asks for Facts	C-6	C6
	Student Thinks	C-7	C7
	Student Asks for Thinking	C-8	C8
	Non-Cognitive Behavior	C-9	C9
	Silence or Confusion*	C-10	C0
Process Scales	Meaning	M	M
	Genuineness	G	G
	Success Promotion	SP	SP
	Respect	R	R
	Student Involvement	SI	SI

*NOTE: Although these variables have the same name, they are not identical because some behaviors which register in F-10 on the Flanders instrument are redistributed among categories C-5 through C-9 on the Cognitive instrument.

Table 9: Tape Data Base

	Year 01	Year 02	Year 03	Total
No. Principals	11	10	6	27
No. Hrs. of Interaction Coded (P - Tapes)	35	31	18	84
No. Teachers	298	211	128	637
No. Hrs. of Interaction Coded (T - Tapes)	2,192	1,632	694	4,518

PROCEDURES FOR ASSESSING TAPE DATA

Not every teacher and principal supplied the complete number of tapes requested. Table 9 displays the actual tape data base in terms of the number of teachers and principals participating and the number of hours of instruction coded by the raters.

In assessing the tapes, four 3-minute segments from each of the tapes were selected at random for evaluation. The first segment was taken from the beginning of the hour, the second from about twenty minutes into the hour, the third segment from about forty minutes into the hour, and the fourth segment towards the end of the hour.

Assessment of Interpersonal Processes

The teacher's levels of skills in interpersonal functioning were assessed blind by raters who applied the Process Scales. Each of the raters completed their evaluations separately. The inter-rater reliabilities for the scales ranged from .898 for Respect to .921 for Student Involvement.

Each of the four 3-minute segments selected from each tape was assigned a rating for each scale. The final measurement for each scale was the mean of ratings for the four segments for that scale. This mean for each scale was the score used in the data analysis.

Assessment of Flanders' Interaction Analysis

All four 3-minute segments for each tape were coded by trained raters using Flanders' Categories for Interaction Analysis. Coding occurred at 3-second intervals. Inter-rater reliabilities were above .96. The data used in the analysis was the total number of 3-second intervals recorded in each category for the tape.

Assessment of Cognitive Functioning

All four 3-minute segments for each tape were coded by trained raters using the Cognitive Functioning Categories. Coding occurred at 3-second intervals. Inter-rater reliabilities were above .94. The data used in the analysis was the total number of 3-second intervals recorded in each category for the tape.

Independence of Tape Data Instruments

Since both the Process Scales and the Flanders' Interaction Analysis Categories deal with affective aspects of verbal interaction, the question arose as to whether they

were independent instruments. Chi-Square analysis was conducted to estimate the independence of the instruments.

The hypothesis for this analysis was that if the instruments were interdependent, then groups which were differentiated by one instrument would also be differentiated by the other instrument at approximately the same level of probability.

Accordingly, the Process Scales were used to identify the twenty highest functioning teachers and the twenty lowest functioning teachers. A middle or "normal" group consisted of those teachers functioning within ± 1 standard deviation of the mean on the Process Scales. T-tests of differences between the group means were significant at $p < .05$ ($\bar{x}_{Hi} \neq \bar{x}_{N} \neq \bar{x}_{Lo}$).

A 10-by-10 Flanders' Interaction Matrix (frequencies of occurrence of Flanders' Categories by sequential pairs) was constructed from the tape data for each teacher. The individual matrixes for the teachers in each of the three groups were then averaged cell-by cell to obtain a Mean Flanders' Matrix for each group. (See Figures 1, 2, and 3). The Matrix of the "Normal" group was used to provide an estimate of the "expected" frequency for each cell in the Matrix. The Matrix of each of the other two groups was treated as a contingency table and Chi-Square was calculated. (Chi-Square for Low functioners = 7.51; Chi-Square for High functioners = 3.89). Neither Chi-Square was significant* at the specified level of probability so the null hypothesis of samples drawn from identically distributed populations was accepted.

The Chi-Square analysis of the Flanders' Interaction Matrixes failed to differentiate groups which <u>had</u> been differentiated by the Process Scales. The conclusion of the researchers was that while there may be some interdependence of the two instruments it was not high enough to invalidate the use of either instrument for the purposes of this project.

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* $\chi^2_{.05,10} = 18.3$

Fig. 1: Mean Flanders' Matrix for "Normal" Group

1st Category in Sequence \ 2nd Category in Sequence	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F1	0.01	0.00	0.0	0.01	0.02	0.01	0.0	0.01	0.01	0.01
F2	0.0	0.11	0.05	0.32	0.48	0.12	0.01	0.20	0.06	0.12
F3	0.00*	0.01	0.16	0.34	0.52	0.05	0.00	0.10	0.05	0.06
F4	0.01	0.02	0.03	6.04	1.66	0.23	0.03	10.84	0.27	2.17
F5	0.01	0.15	0.05	6.62	68.05	1.69	0.20	4.46	2.57	4.73
F6	0.0	0.01	0.00	0.40	0.89	2.54	0.05	1.33	0.13	1.01
F7	0.0	0.00	0.00	0.08	0.16	0.05	0.47	0.09	0.04	0.19
F8	0.02	0.98	0.88	4.94	8.64	0.82	0.15	52.26	0.54	2.80
F9	0.01	0.11	0.10	0.47	2.53	0.11	0.04	0.21	5.65	1.02
F10	0.00	0.08	0.03	2.02	5.16	0.75	0.13	2.84	1.08	20.65
Total	0.06	1.47	1.30	21.24	88.11	6.37	1.08	72.34	10.40	32.76

*0.00 indicates a negligible quantity but one that is <u>not</u> absolute zero as indicated by 0.0

Fig. 2: Mean Flanders' Matrix for Low Functioners

1st Category in Sequence \ 2nd Category in Sequence	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F1	0.01	0.0	0.0	0.01	0.03	0.0	0.0	0.01	0.0	0.01
F2	0.0	0.04	0.02	0.52	0.52	0.18	0.0	0.34	0.06	0.11
F3	0.0	0.01	0.05	0.19	0.32	0.02	0.01	0.08	0.07	0.05
F4	0.0	0.05	0.01	4.60	1.34	0.19	0.02	11.30	0.45	1.92
F5	0.01	0.15	0.04	5.90	58.05	1.44	0.31	5.20	3.67	5.18
F6	0.0	0.01	0.0	0.38	0.68	1.72	0.05	1.53	0.19	0.98
F7	0.0	0.0	0.0	0.05	0.24	0.03	0.57	0.07	0.07	0.21
F8	0.03	1.37	0.59	5.54	9.04	1.12	0.14	53.43	0.78	3.43
F9	0.01	0.11	0.10	0.63	3.67	0.15	0.05	0.36	8.10	1.53
F10	0.02	0.06	0.01	1.84	5.65	0.64	0.14	3.52	1.47	23.23
Total	0.08	1.80	0.82	19.66	79.54	5.49	1.29	75.84	14.86	36.65

Fig. 3: Mean Flanders' Matrix for High Functioners

1st Category in Sequence \ 2nd Category in Sequence	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F1	0.0	0.0	0.0	0.01	0.01	0.0	0.0	0.01	0.0	0.01
F2	0.0	0.10	0.04	0.39	0.49	0.19	0.01	0.15	0.11	0.14
F3	0.0	0.01	0.22	0.45	0.49	0.11	0.0	0.10	0.02	0.13
F4	0.0	0.02	0.06	7.37	1.85	0.28	0.03	12.22	0.19	2.22
F5	0.0	0.11	0.08	6.78	61.70	1.82	0.25	4.79	2.71	5.17
F6	0.0	0.03	0.01	0.52	0.92	3.90	0.09	1.56	0.21	1.29
F7	0.0	0.0	0.0	0.10	0.19	0.07	0.49	0.12	0.12	0.20
F8	0.03	1.13	1.01	5.83	8.92	1.04	0.18	49.81	0.74	2.79
F9	0.0	0.10	0.09	0.62	2.87	0.14	0.09	0.37	5.63	0.95
F10	0.0	0.13	0.05	2.20	5.53	0.90	0.17	2.68	1.25	20.06
Total	0.03	1.63	1.56	24.27	82.97	8.45	1.31	71.81	10.98	32.96

PART II

Presentation of Basic Studies

STUDY NUMBER 1

RESULTS OF MULTILINEAR REGRESSION ANALYSIS USING PRINCIPAL BEHAVIOR TO PREDICT TEACHER BEHAVIOR

PURPOSE OF STUDY

This study asked two questions:

1. Is there a significant relationship between the Principal's functioning and the functioning of the teachers in his school?

2. What factors of the principal's behavior are the best predictors of his teacher's behavior?

DESIGN

Sample

The study population were the 11 principals and 250 teachers of 11 schools from the Year 01 Sample. The eleven schools included 8 Elementary schools (grades 1-6), 1 Jr. High school, (grades 7-9), and 2 Sr. High schools (grades 10-12). The total Year 01 sample included a second Jr. High school but the principal in that school failed to supply his data to be used for this study, although his teachers did participate.

Data Collection

The data was collected from one-hour audio tape recordings supplied by the participants. The principals supplied recordings of their faculty meetings and/or other interaction with their faculty while the teachers recorded instruction in their classrooms. Only teachers who had supplied 4 or more tapes during the year were included in the study. Tapes from both the principals and teachers were coded for the same set of 25 variables: 10 categories of Flanders Interaction Analysis, 10 categories of Cognitive Functioning, and 5 Process Scales.

Assessment of Flanders' Interaction Analysis

The score recorded for each tape was the total number of 3-second periods tallied in each category of Flanders' Interaction Analysis from four 3-minute segments of the tape.

The 10 categories coded were:

F-1 - Teacher (Principal) Accepts Feelings of Student (Teacher)
F-2 - Teacher (Principal) Uses Praise or Encouragement
F-3 - Teacher (Principal) Accepts Ideas of Student (Teacher)
F-4 - Teacher (Principal) Asks Question
F-5 - Teacher (Principal) Lectures
F-6 - Teacher (Principal) Gives Directions or Commands
F-7 - Teacher (Principal) Criticizes or Justifies Authority
F-8 - Student (Teacher) Responds to Teacher (Principal)
F-9 - Student (Teacher) Initiates Interaction
F-10 - Silence or Confusion

Assessment of Cognitive Functioning Categories

The same segments of each tape were coded for Cognitive Functioning Categories. The scores recorded for the tape were the total number of 3-second periods tallied for each category. The 10 categories coded were:

C-1 - Teacher (Principal) Recalls Facts
C-2 - Teacher (Principal) Asks Someone to Recall Facts
C-3 - Teacher (Principal) Demonstrates Thinking Above Memory Level
C-4 - Teacher (Principal) Asks Someone to Demonstrate Thinking
C-5 - Student (Teacher) Recalls Facts
C-6 - Student (Teacher) Asks Someone to Recall Facts
C-7 - Student (Teacher) Demonstrates Thinking Above Memory Level
C-8 - Student (Teacher) Asks Someone to Demonstrate Thinking
C-9 - Non-Cognitive Behavior
C-10 - Silence or Confusion

Assessment of Process Levels

The participant's levels of interpersonal functioning were assessed "blind" by raters who applied 5 Process Scales. Each of the four 3-minute segments selected from each tape was assigned a rating for each scale. The final score recorded for each scale was the mean of ratings on the tape segments for that scale. The five Process Scales used were:

M - Meaning: The Teacher's (Principal's) empathy or understanding of the meaning-to-the child (teacher) of his school-related experiences.

G - Genuineness: The Teacher's (Principal's) person-to-person basis for interactions.

R - Respect: The Teacher's (Principal's) respect for the child (teacher) as an individual with the capacity for achieving.

SP - Success Promotion: The degree to which the Teacher (Principal) promotes the success of the student's (teacher's) goals in moment-to-moment processes.

SI - Student Involvement: The degree to which the students (teachers) are involved in and excited about their learning (current) activities.

It was necessary to discriminate between variables measuring the teacher-student interaction and those referring to principal-teacher interactions. Therefore, the letter T was prefixed to the variable symbol when it refers to the teacher-student interactions and the letter P was prefixed when reference is to the principal-teacher interaction.

ANALYSIS

The data for the study was the grand mean for the year for each individual participant on each of the variables. With this data, 25 stepwise multilinear regression analyses were carried out, using in turn each of the 25 Teacher Behavior Variables as the dependent variable.

Because the sample included only 11 principals, only 10 of their variables could be used as independent variables in each regression. Therefore 9 variables were selected on theoretical grounds as those more probable to predict the behavior of the teachers. These 9 variables used in <u>all</u> the analyses were the principals' scores on:

P-F2 - Use of Praise and Encouragement
P-F3 - Acceptance of Teacher's Ideas
P-F7 - Use of Criticism or Justification of Authority
P-C1 - Recall of Facts (Memory, Lecture)
P-C2 - Asking Fact Questions
P-C4 - Asking Thinking Questions
P-M - Understanding of the Meaning of the Teacher's Experience
P-SP - Promoting the Success of the Teacher's Goals
P-R - Communicating Respect for the Teacher

Additionally, in the 16 analyses in which the dependent variable was <u>not</u> the same-named variable (<u>for teachers</u>) as one of the 9 independent variables identified above, a tenth independent variable was used. This was, of course, the principals' scores on the variable with the same name as the dependent variable.

RESULTS

Data Parameters

The means and standard deviations for both the principals' and the teachers' scores on the 25 variables are displayed in Table 10. The Flanders' and Cognitive scores are expressed as the number of 3-second intervals tallied for the category during 12 minutes selected at random from an hour of interaction. Thus, a mean of .46 for F-1 indicates that almost ½ of one 3-second interval during the twelve minutes was spent in accepting feelings. (To convert means to Percent of Classtime, divide the mean by 240 -- the number of 3-second intervals in twelve minutes).

By examining the data in Table 10, an over-all picture of principal and teacher functioning is revealed. Several items of particular interest are discussed below.

Regarding Principal Functioning

1. In faculty meetings, these principals spent almost 7 times as much time criticizing teachers and justifying authority as they spent in praising them, accepting their ideas, or accepting their feelings. In fact, they spent 3 times as long in Category F-7 as in Categories F-1, F-2, and F-3 combined.

2. On the average, these principals spent 27 times as much meeting time talking as they spent in asking teachers to contribute to the meeting.

3. The ratio of total principal talk (Sum of Categories F1-F7) to total teacher talk (sum of categories F8 and F9) was 3 to 1.

4. Principals ran very businesslike faculty meetings -- only 5% of the time was spent in silence or confusion.

5. Principals spent 16,743 times as long in recalling facts as they did in demonstrating thinking, on the average.

6. They asked 24 times as many fact questions as questions eliciting a thinking response.

Comparing Principal versus Teacher Functioning

1. Principals accepted teacher's feelings more than teachers accept students feelings.

2. Principals gave praise and accepted teacher's ideas less than teachers did for their students.

Table 10: Parameters of Data -- Means and Standard Deviations of Principals' and Teachers' Scores on Study Variables

	VARIABLES	PRINCIPALS		TEACHERS	
		$\bar{X}$	$\hat{\sigma}$	$\bar{X}$	$\hat{\sigma}$
Flanders' Categories	F-1	0.46	1.26*	0.06	0.15*
	F-2	0.38	0.98*	1.58	1.63*
	F-3	0.29	0.32*	1.38	1.28
	F-4	7.62	5.63	22.56	10.97
	F-5	163.60	25.68	88.00	33.16
	F-6	1.04	1.10*	6.74	4.70
	F-7	3.59	7.52*	.99	1.52*
	F-8	31.91	13.52	74.50	34.15
	F-9	18.84	11.29	10.00	8.73
	F-10	12.22	9.77	34.13	23.68
Cognitive Functioning Categories	C-1	167.43	23.69	97.42	30.76
	C-2	8.45	5.97	22.03	10.43
	C-3	0.01	0.04*	.32	.85*
	C-4	.17	0.24*	.004	.01*
	C-5	38.08	15.85	77.38	31.45
	C-6	3.53	2.88	1.81	2.28*
	C-7	6.71	8.66*	3.12	4.35*
	C-8	1.26	2.29*	0.35	0.73*
	C-9	2.11	2.79*	2.70	3.06*
	C-10	12.19	8.55	33.47	23.09
Process Scales	M	2.8	0.326	2.7	0.219
	G	2.9	0.335	2.7	0.222
	SP	2.8	0.320	2.7	0.232
	R	2.9	0.465	2.8	0.223
	SI	2.7	0.575	2.9	0.202
		N=11		N=250	

*Standard Deviation larger than the mean

3. Principals asked fewer questions of teachers than teachers ask of their students but principals had a higher proportion of time spent asking thinking questions. The ratio of intervals tallied for thinking to fact questions asked by principals was 24-to-1; for teachers, the ratio was 550-to-1.

4. In general, principals functioned at higher levels of interpersonal skills than teachers (scores on Process Scales). The one exception was Student Involvement -- Students become more involved in their learning activities than teachers become involved in faculty meetings.

5. In Table 10, asterisks indicate those variables where the standard deviation is larger than the mean. Inspection of the raw data for those variables reveals that there are many cases in which the score for the variable was zero. That is, many individuals had no occurrence of the behavior named by this variable on their tapes; and the mean of the variable was lowered by these incidences of zero. Variables common to both principals and teachers in which many individuals registered zero were F-1, F-2, F-7, C-3, C-4, C-7, C-8, and C-9. These categories deal with either affective behaviors or higher levels of thinking behaviors. Principals also scored zero in several cases in F-3 (accepting ideas) and F-6 (giving commands or directions). Teachers registered zero in some cases for C-6 (fact questions asked by their students).

The correlations of the principals' and teachers' scores on the same variable are displayed in Table 11. The correlations of each of the dependent variables with the 9 independent variables common to all the regression analyses is displayed in Table 12.

Results from Regression Analysis

Table 13 summarizes the results of the 25 multilinear regression analyses. As you can see, it was not possible to build models for 3 of the 25 variables. Of the 22 regressions completed, 16 were significant at the .01 level and three more at the .05 level while the last three were not significant until the .10 level. This means that 19 regressions were at acceptable levels of significance; indicating that there is definitely a non-chance relationship between the principal's functioning and the functioning of the teachers in his school. Although the RSQ's achieved are not extremely high (ranging from .01 to .29) this is to be expected since there are many other factors potentially affecting teacher functioning (class size, time of

Table 11: Correlation of Principals' and Teachers' Scores on Same Variable

Variable	r
F-1	.20
F-2	.28
F-3	.06
F-4	.07
F-5	.06
F-6	.22
F-7	.11
F-8	-.24
F-9	.12
F-10	-.08
C-1	-.01
C-2	.12
C-3	-.07
C-4	.01
C-5	-.12
C-6	-.11
C-7	.02
C-8	.16
C-9	-.004
C-10	-.09
M	-.12
G	-.11
SP	-.09
R	-.004
SI	-.05

Table 12: Correlation Matrix of Independent Versus Dependent Variables

	Dependent Variables	Independent Variables: Principals' Scores on Variables								
	Teacher's Scores	P-F2	P-F3	P-F7	P-C1	P-C2	P-C4	P-M	P-SP	P-R
Flanders' Interaction: Teacher Behaviors	T-F1	.16	.02	-.12	-.12	-.10	.03	.009	.03	.10
	T-F2	.28	-.11	.31	-.03	.23	-.004	-.26	-.31	-.17
	T-F3	.28	-.06	.05	-.11	.04	.06	-.05	-.07	.03
	T-F4	.16	.07	.23	-.03	.11	.04	.23	-.24	-.25
	T-F5	-.16	-.04	-.16	-.01	-.17	.06	.02	.08	.11
	T-F6	.13	.07	.17	-.04	.17	-.04	-.11	-.15	-.12
	T-F7	.03	-.14	.11	.17	.06	-.06	.09	-.004	-.14
Flanders' Interaction: Student Behavior	T-F8	.08	.25	.11	.11	.03	-.09	-.08	-.09	-.22
	T-F9	.07	-.07	-.14	.10	-.08	.07	.11	.11	.20
	T-F10	-.06	.02	-.05	-.08	.11	.01	.18	.14	.24
Cognitive Functioning: Teacher Behaviors	T-C1	-.13	-.05	.12	-.01	-.15	.05	-.01	.04	.08
	T-C2	.21	.09	.25	-.06	.12	.04	.27	.29	-.26
	T-C3	-.02	.05	-.10	-.04	-.10	.01	.01	.06	.12
	T-C4	-.004	.01	.02	-.01	.004	.01	-.06	-.03	-.03
Cognitive Functioning: Student Behaviors	T-C5	.11	.007	.11	.09	.03	-.08	-.08	-.10	-.21
	T-C6	-.11	-.03	-.21	-.10	.009	.05	.31	.29	.41
	T-C7	.01	-.01	-.06	-.03	-.02	-.006	.04	.07	.06
	T-C8	.04	-.03	-.09	-.07	-.08	.03	-.02	.02	.12
	T-C9	.05	-.07	.06	.03	.04	.06	.08	.01	-.01
	T-C10	-.06	.02	-.08	-.06	.09	.002	.21	.17	.24
Inter-Personal Processes	T-M	.08	-.08	.10	-.01	.06	.01	-.12	-.11	-.05
	T-G	.06	-.08	.09	-.002	.04	.01	-.11	-.10	-.04
	T-SP	.07	-.09	.10	-.02	.07	.02	-.10	-.09	-.02
	T-R	.09	-.09	.11	-.04	.08	.03	-.11	-.11	-.004
	T-SI	.12	-.13	.09	.05	.07	-.07	-.08	-.08	-.06

Table 13: Summary of Full Models for 25 Stepwise Multilinear Regressions of Principal Behavior as Predictor of Teacher Behavior

Dependent Variables	Total RSQ Achieved	F-Ratio For Regression	Sig. Level p <	Standard Error of Estimate	# Variables in Final Equation	# Steps Performed
T-F1	.05	7.029	.01	0.1498	2	2
T-F2	.21*	17.849	.01	1.4542	4	4
T-F3	.09	13.483	.01	1.2241	2	2
T-F4	.17	10.592	.01	10.0820	5	5
T-F5	.29*	12.939	.01	28.3502	8	10
T-F6	.18	11.896	.01	4.2795	5	11
T-F7	.10	7.815	.01	1.4482	4	8
T-F8	.13	10.179	.01	31.9599	4	4
T-F9	.11	6.666	.01	8.2931	5	5
T-F10	.10	10.315	.01	22.5061	3	3
T-C1	.22*	10.458	.01	27.4525	7	9
T-C2	.22*	15.071	.01	9.2567	5	7
T-C3	.02	4.300	.05	0.8469	1	1
T-C4			NS			
T-C5	.11	6.341	.01	29.9534	5	5
T-C6	.24*	20.489	.01	2.0033	4	4
T-C7			NS			
T-C8	.03	5.113	.05	0.7260	2	2
T-C9			NS			
T-C10	.10	10.307	.01	21.9385	3	3
T-M	.02	4.121	.05	0.2177	1	1
T-G	.01	3.346	.10+	0.2212	1	1
T-SP	.01	2.880	.10+	0.2317	1	1
T-R	.01	3.609	.10+	0.2200	1	1
T-SI	.02	4.970	.05	0.2005	1	1

NS = F - level insufficient for computation of equation
+ Not at acceptable level ($p < .05$) of significance
* Models accounting for meaningful amounts of variance

year, subject matter, personal competencies in curriculum and methodology, and even the physical plant of the school). The fact that significant relationships exist at all is important.

To determine which of the principal's behaviors are the most important predictors of teacher behavior, it is necessary to examine the regression analyses more closely. Table 14 shows which independent variable entered into the model for each dependent variable, the amount of increase in RSQ upon entry, and whether entry occurred at the 1st, 2nd, or subsequent steps. It does not report a variable which was entered and later removed unless it entered at the 1st or 2nd steps; then the entry is reported with a slash through it to indicate that it was later removed.

Variables F-2 and F-3 were the most active with 11 predictive appearances each. However all but one of their entries were at the second or later steps. Six of Respect's 8 entries occurred at the 1st step and 2 of C-2's eight entries occurred at the 1st step. M had 10 entries with 4 occurring at the 1st step; however, three of these were in regressions which did not reach a satisfactory level of significance.

In general, then, it would appear that the principal's level of Respect (P-R) for his teachers is the most powerful predictor followed closely by his Use of Praise (P-F2) and Acceptance of Ideas (P-F3) in that order. The number of Fact Questions asked by the Principal is also a good predictor of teacher behavior.

From Examination of Regression Equations

A closer examination of selected regression equations supports this general idea. The regressions to be examined more closely were selected on three bases:

1. They reached a meaningful level of RSQ (explaining 20% or more of the variance) in the regression summarized in Table 13.

2. They reached a level of significance of $p < .01$.

3. They were for variables which have been found useful in predicting student gain from teacher behavior. (See Study No. 14 in which teacher behavior variables F-2, F-3, F-6, F-7, C-3, C-8, M, and SI proved to be predictive of variance in total days absent for the year and of gains on self-concept and achievement indices).

Table 15 displays regression equations for the selected variables. It does not display the full equation summarized

Table 14: Summary of Increase in RSQ at Entry of Variable into Model for the 22 Models Constructed

	Dependent Variables	Independent Variables										
		P-F2	P-F3	P-F7	P-C1	P-C2	P-C4	P-M	P-SP	P-R	Other	(Var.) (Name)
Flanders'	T-F1	.01++									.04+	(P-F1)
	T-F2	.09++	.01	.09+			.01					
	T-F3	.07+					.01++					
	T-F4	.03	.02		.01	.03++				.06+		
	T-F5	.03++	.04	.009	.03	.03+			.05	.008	.04	(P-F5)
	T-F6	.01	.02		.04	.02++					~~.04++~~	(P-F6)
	T-F7	.01			.03+	~~.02++~~		.01	.01			
	T-F8	.01	.01		~~.01++~~	.03					.05+	(P-F8)
	T-F9		.03	.01		.01++	.01			.04+		
	T-F10							.01++	.03	.06+		
Cognitive	T-C1	.01++	.04		.02	.02+	.02	.01	.05			
	T-C2	.02	04		.01	.03			~~.08+~~	.02++		
	T-C3			.02+								
	T-C5	.01++				.01		.02	.01	.04+		
	T-C6		.01				.02	.03++		.17+		
	T-C8		.01++								.02+	(P-C8)
	T-C10							.02++	.02	.06+		
Process	T-M							.02+				
	T-G							.01+				
	T-SP							.01+				
	T-R							.01+				
	T-SI		.02+									
# 1st Step Entries		1	1	2	1	2		4	1	6		
# 2nd Step Entries		5	1		1	4	1	3		1		
# Later Steps		5	9	2	5	3	4	3	6	1		
Total # Predictive Appearances		11	11	4	7	9	5	10	7	8		

+Entered at 1st Step ++Entered at 2nd Step /Subsequent removal of Variable originally entered at 1st or 2nd step

*Variable (F-6) subsequently re-entered with RSQ increase of .02

Table 15: Selected Regression Equations

RSQ Achieved	F-Ratio For Regression	Sig. Level $p <$	Standard Error of Estimate	Regression Equation
.21	22.402	.01	1.4614	T-F2 = 1.243 + 0.492F2 + 0.085F7 - 0.833C4
.09*	13.483	.01	1.2241	T-F3 = 1.112 + 0.397F2 + 0.682C4
.16	11.756	.01	30.7152	T-F5 =145.931 - 10.098F2 - 2.791C2 - 3.923SP + 2.85R
.10*	7.399	.05	4.4914	T-F6 = 13.082 - 0.709F6 - 0.182F7 + 0.351C2 - 0.323R
.11*	7.815	.05	1.4482	T-F7 = -0.659 + 0.157F2 + 0.009C1 + 0.384M - 0.380SP
.12	8.946	.02	29.0318	T-C1 =156.120 - 8.269F2 - 2.371C2 - 3.68SP + 2.371R
.17	17.292	.01	9.5741	T-C2 = 38.633 + 2.458F2 + 0.435C2 - 0.730R
.23	25.806	.01	2.0139	T-C6 = -8.604 + 1.567C4 + 0.180M + 0.171R

*Equations reported for these variables because of their utility in predicting student achievement from teacher behavior.

in Table 13 and 14, however. Instead, it shows the most efficient equation for each variable; that is, the equation which can explain a reasonable amount of the variance with the fewest number of variables.

In the equations shown, the independent variables R, F-2, C-2, C-4, and SP appear frequently. Examination of their functions in the equations yields the following information:

1. As the level of the principal's respect (R) for the teachers in his school increases, the teachers...

   (a) use slightly more lecture
   (b) give fewer commands and directions to students
   (c) recall more facts
   (d) ask fewer fact questions
   (e) allow children to ask more fact questions

2. As the principal uses more Praise and Encouragement (F-2) with his teachers, in their classrooms the teachers...

   (a) give more praise and encouragement to students
   (b) accept more student ideas
   (c) use less lecture
   (d) use slightly more criticism and justification of authority
   (e) spend less time recalling facts
   (f) ask more questions of students

3. As the principal asks more fact questions (C-2) of his teachers, the teachers when working with their students...

   (a) use less lecture
   (b) give more commands and directions
   (c) use less recall of facts
   (d) ask more questions of their students

4. As the principal asks more thinking questions (C-4) of his teachers, the teachers when working with their students...

   (a) give less praise
   (b) accept more student ideas
   (c) allow more student questions

5. As the principal's level of success promotion (SP) increases, the teachers in his school...

(a) use less criticism and justification of authority
(b) use less lecture
(c) spend less time recalling facts

In general, the functions listed above are in a direction consonant with this conclusion: As a principal uses higher levels of interpersonal and interactional skills with his teachers, they use higher levels of skills with their students. The exceptions to this are those listed in 1a, 1c, and 2d.

DISCUSSION

Although it seems clear that there is a significant relationship between the principal's behavior and the behavior of the teachers in his school, the exact nature of the dynamics of that relationship are not clear. Hypotheses for the possible dynamics for the relationship include the following suggestions.

Selection: The principal generally has some control over the assignment of teachers to his school. He may select those teachers who function in ways that he admires and respects... probably ways similar to the ways in which he functions. There is no evidence in the data to support this hypothesis; but on the other hand there is no evidence to reject it.

Modeling: The principal may serve as a model of interactive and cognitive behavior for his teachers. In the examination of the functioning of the five independent variables in the regression equations, there is some data to support this conclusion. Particularly the relationships delineated in the "Other" column of Table 14 and in items 2 and 3 (c.f. ante, p. 39) seem to support a modeling association.

Expectation: The principal may express expectancies for his teachers' classroom performance which they, more or less successfully, attempt to meet. There is no evidence in the data to support or to deny this hypothesis.

Facilitation: As the principal uses high levels of interpersonal skills with his teachers, he makes them feel accepted and secure and they then function at higher levels with their students. Some slight evidence for this can be found in items 1 and 5 (c.f. ante, p. 39) although 1a and 1c do not reflect this dynamic.

In all probability, some combination of the hypotheses is the most realistic delineation of the relationship. It may well be, for instance, that as the principal uses high levels of interpersonal skills with his teachers he comes to be a significant other for them and they therefore try hard to meet his expectancies and model their interactive and cognitive behavior after his.

SUMMARY

In conclusion, the findings from this study are:

1. Descriptive data of principal and teacher functioning were presented.

2. Significant ($p < .05$) predictive relationships between the principal's interpersonal behavior and the teacher's classroom behavior were detected for 19 of the 25 dependent variables.

3. RSQ's for the 19 significant models ranged from .02 to .29.

4. Five of the 19 significant models accounted for meaningful amounts of variance with RSQ> .20.

5. The best predictors of the teacher's behavior were identified as the principal's (a) level of Respect for the teacher, (b) Use of Praise, (c) Acceptance of Ideas, and (d) Asking of Fact Questions.

6. The functions of the predictive variables in the regression equations support the following statement of the directionality of the relationship: As a principal uses higher levels of interpersonal and interactional skills with his teachers, they use higher levels of these skills with their students.

Implications of these findings for applied research studies are:

1. Since it seems clear that there is a significant relationship between the principal's behavior and that of the teachers in his school, efforts to change teacher behavior should involve the principal as an active participant and supporter and, if possible, as a leader of the innovative efforts.

2. Further investigation of this relationship seems indicated in order to determine causative dynamics.

3. One hypothesis which should be tested is that prior training of the principal and/or other instructional leader (in the specific skills goals for the teacher training program) would enhance the skills acquisition of the teachers.*

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*This hypothesis was tested in the Year 03 sample.

STUDY NUMBER 2

KRUSKAL-WALLIS ONE-WAY ANALYSIS OF VARIANCE BY RANKS OF TEACHER SELF-REPORT DATA

PURPOSE OF STUDY

The purpose of this study was to validate the relationships detected in Study No. 1 by seeing if a similar relationship could be detected in self-report rather than observational data. Therefore, the following question was posed:

> When teachers are grouped according to the way in which their school principals are ranked on interpersonal functioning, are there significant differences among the response means of the groups on measures of teacher perception of work environment and instructional tasks?

DESIGN

Sample

The sample for the study consisted of the principals of all 12 Year 01 schools and all Year 01 teachers who (1) had taught the previous full school year in their currently assigned school and (2) had completed both the School Climate Semantic Differential and the Minnesota Teacher Attitude Inventory pretests. Total N for teachers was 257.

Data Collection

The principals were ranked in order of their mean rated levels of interpersonal functioning. Raters were (1) NCHE trainers and (2) local school system Professional Growth and Development Co-ordinators. Ratings were made on the basis of the raters' perceptions of the over-all level of interpersonal functioning of the individual.

Teachers were administered the School Climate Semantic Differential (SD) and the Minnesota Teacher Attitude Inventory (MTAI) by NCHE trainers in August of 1971. The instruments were scored at the NCHE center in Monroe, La.

The MTAI yields one score which can be considered a measure of the "child-centeredness" of the teacher. The SD* yields 17 sub-scores on various aspects of school climate and one Total score which is the sum of the 17 sub-scores. Each sub-score is considered to be a measure of "the attractiveness to the teacher" of that particular aspect of the total school operation. Possible range of the sub-scores is from 8 to 54 by intervals of one.

ANALYSIS

The teachers were assigned as intact groups by school to one of three samples on the basis of the rank (see above) of the principal of the school. Faculties of the 4 highest ranked principals were assigned to Sample 1, the middle 4 to Sample 2, and the lowest 4 to Sample 3.

Since the teachers were assigned as intact groups, the data used in the analysis was the school mean (mean of the scores of the individual teachers in the school) on each of the variables. (These means are displayed in Table 16). The means of each variable were converted into ranks and a Kruskal-Wallis One-Way Analysis of Variance by Ranks was conducted separately for each of the 19 variables.

RESULTS

Table 17 displays the results of the analyses. Six of the 19 variables proved to be significant at the $p < .05$ level. So for these six variables, the null hypothesis was rejected and the samples were considered to come from differently distributed populations. Since one of these variables was the Semantic Differential Total Score and since 6 out of 19 significant tests is six times the number expected by chance at the .05 level of probability, the following conclusion was drawn: teachers whose principals differ in their levels of interpersonal functioning do, in fact, report different perceptions of their work environment and instructional tasks.

DISCUSSION

The above conclusion is supported by a closer examination of Table 17. The sum of the ranks for Sample 1 (schools of high functioning principals) is in every case (except the MTAI scores) higher than that of either of the other two groups.

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*See Appendix for the Instrument.

Table 16: School Means for MTAI and SD Variables by Groups

Variables	Schools of Highest Ranking Principals				Schools of Middle Ranking Principals				Schools of Lowest Ranking Principals			
	B*	E	F	K	A	D	H	I	C	L	G	J
MTAI	25.67	34.61	10.05	19.27	17.65	27.05	31.56	19.02	21.14	29.68	26.92	31.53
Aspects (Sub-Scores) of SD #1	48.53	51.72	49.20	53.36	48.20	46.50	43.83	48.77	46.05	45.61	43.24	46.50
#2	42.60	46.11	41.40	44.36	38.10	44.00	44.22	43.32	38.55	41.50	40.48	40.28
#3	41.67	44.78	43.20	45.64	42.05	44.63	40.28	38.77	40.85	38.64	39.60	37.78
#4	47.20	48.33	46.95	53.93	50.45	49.29	42.61	44.84	44.15	46.75	41.60	41.78
#5	44.73	42.00	44.40	49.43	41.40	44.33	44.22	40.77	41.00	43.75	41.64	40.06
#6	44.21	44.35	43.65	47.43	41.10	43.09	43.22	41.23	42.05	41.68	37.63	39.18
#7	41.00	40.28	39.65	38.79	37.05	38.61	42.22	33.27	41.45	31.54	32.38	32.29
#8	44.50	50.28	41.60	48.71	43.42	39.13	41.28	36.79	44.15	38.50	35.83	37.82
#9	47.80	48.61	46.60	53.29	42.85	46.92	49.17	45.52	46.00	46.86	44.76	43.78
#10	37.73	43.47	43.60	49.36	38.60	41.67	42.72	38.28	40.15	39.89	37.32	38.17
#11	41.60	45.28	38.15	40.29	35.75	39.58	37.20	40.82	40.30	37.36	37.64	37.11
#12	47.73	48.00	43.95	50.79	40.21	49.17	48.22	42.66	46.79	42.68	45.63	42.44
#13	52.60	53.67	50.70	52.21	47.58	53.08	52.28	50.00	49.53	50.57	49.00	45.50
#14	51.93	51.89	48.30	51.64	47.32	50.17	45.22	47.20	48.40	47.33	42.64	45.50
#15	43.80	40.50	42.15	42.57	35.30	41.50	39.94	34.88	35.45	33.00	35.48	35.94
#16	49.73	48.56	50.20	47.71	44.65	42.75	43.06	42.36	44.90	43.71	41.28	38.17
#17	45.80	50.72	49.89	50.64	47.50	50.70	47.67	44.71	45.25	49.68	41.84	39.33
Total SD	764.53	793.67	761.10	820.14	712.60	757.96	747.67	706.95	730.20	717.36	681.92	675.56

*Code letters for schools are randomly assigned designates to protect anonymity of subjects. Schools are arranged in order from A-L within groups and not by ranks of principals.

Table 17: Summary of Kruskal-Wallis One-Way Analysis of Variance by Ranks for 19 Teacher Perception Variables

Variables	ΣR_1	ΣR_2	ΣR_3	H or H' Statistic+
MTAI	23	24	31	0.729
Semantic Differential Total	42	22	14	7.998*
SD Sub-Categories:				
1. Present school situation	41	23.5	13.5	7.495*
2. Teaching educationally disadvantaged students	35	28	15	3.960
3. Leadership and services provided by central office	39	26	13	6.498*
4. Faculty group planning activities	36	29	13	5.344
5. Educational change through innovation	39	23	16	5.344
6. Evaluation of educational practices	42	22	14	7.998*
7. Inservice training activities	34	27	17	2.806
8. Parent interest and cooperation	40	21	17	5.806
9. Individualized instruction	37	24	17	3.960
10. The non-graded organizational structure	35	26	17	3.114
11. The graded organizational structure	37	21	20	3.498
12. Instructional emphasis on pupil self-concept	34	25	19	2.191
13. Your fellow faculty members	37	27	14	5.114
14. Your school philosophy	40	20	18	5.691
15. Action research projects	41	21	16	6.729*
16. School-community relationships	42	19	17	7.421*
17. Local school leadership	36	27	15	4.268

*sig. at $p < .05$; $\chi^2_{.05,\ 3} = 5.991$

+H' is used when there are tied ranks

Examination of the nature of the significant variables reveals that three of the five sub-score variables reflect aspects of school organization which are strongly and directly affected by the school principal's functioning. The principal is responsible for requesting and scheduling services from the Central Office (Aspect 3); he is the primary Public Relations Officer for the school and hence has a direct effect on school-community relationships (Aspect 16); and he is the primary source of teacher evaluation (Aspect 6). Aspect 1 (Present school situation) is certainly affected by the principals' functioning although perhaps not in so direct a manner as the other three.

One aspect (Local school leadership) which had been expected to show a significant difference among groups was not significant at the .05 level although it was significant at the .10 level. However, scores on this aspect did provide some degree of anecdotal validation for the rating procedure used to rank the principals. The lowest mean score on this aspect was achieved by the faculty of the school whose principal had received the lowest ratings from both the NCHE trainers and the local school system co-ordinators. He was also the one principal who did not submit tapes for rating during the year.

SUMMARY

The conclusion drawn from this study was that teachers whose principals differ in their levels of interpersonal functioning do, in fact, report different perceptions of their working environment and instructional tasks. Thus, this analysis supports the findings from Study Number 1 and further emphasizes the need to involve the principal as an active supporter of any program designed to change instructional behavior.

STUDY NUMBER 3

GRADE-LEVEL CONTRIBUTIONS TO THE VARIATION OF FLANDERS' INTERACTION ANALYSIS CATEGORIES

PURPOSE OF STUDY

This study asked two questions:

1. Is the grade-level at which the teacher instructs a significant contributor to differences among the means of Flanders' Interaction Analysis Categories?

2. When adjusted for appropriate measures of individual teacher characteristics, is there a significant difference among the grade-level means of Flanders' Interaction Analysis Categories?

DESIGN

Sample

The sample for this study consisted of all Year 01 teachers who (1) had submitted 5 or more tapes during the year and (2) had completed the MTAI pre-test in August, 1971. Total N was 238. The bottom line of Table 18 displays the N by grade-level.

Data Collection

The MTAI (Minnesota Teacher Attitude Inventory) was administered during a pre-school in-service training session and scored at the NCHE offices. Each teacher subsequently submitted to NCHE monthly audio tape recordings of one continuous hour of instruction. These recordings were evaluated by trained NCHE raters for several variables including 10 categories of Flanders' Interaction Analysis and 5 Process Scales. For details of the assessment procedures, see Part I, Procedures for Assessing Tape Data.

For Flanders' Categories, the score recorded for each tape was the total number of 3-second periods tallied in each category during 12 minutes selected at random in four 3-minute segments. For Process Scales, the data recorded for each teacher was the mean of the ratings for the four 3-minute segments. The data used in this analysis was the Teacher's Grand Mean for the year on each category or scale. Table 18 displays the grade-level means of the Flanders' Categories.

Table 18: Unadjusted Flanders' Means by Grade Level

Flanders' Categories	Grade Levels							
	1	2	3	4	5	6	(7-9)	(10-12)
F-1*	0.0285	0.0427	0.0062	0.0343	0.0583	0.0957	0.0556	0.0920
F-2	2.6410	2.6059	1.8033	1.4373	1.9296	2.0486	0.7982	0.5094
F-3	1.6515	1.8464	1.3371	1.9119	1.7078	1.5081	1.2051	1.0435
F-4	30.8289	27.4167	27.0795	31.6252	27.6743	25.0885	14.2571	16.0882
F-5	77.3794	67.2072	58.5194	83.1528	73.5299	74.7485	86.9145	115.5145
F-6	11.7990	8.7700	8.7500	7.5257	5.9135	7.1024	6.0495	3.7280
F-7	1.7405	1.6391	0.8705	0.9129	1.2748	0.6762	1.1313	0.4365
F-8	75.2039	85.9858	104.4380	73.4237	89.3251	92.2937	66.0386	56.9603
F-9	7.0515	9.0400	6.8838	7.3643	8.8478	6.3471	14.2346	13.5381
F-10	31.6810	35.4549	30.3175	32.6204	29.7482	30.1004	49.3194	32.0937
N	20	22	21	21	23	21	39	71

*See Table 20 for Variable Names

ANALYSIS

One series of one-way analysis of variance and two series of one-way analysis of co-variance were planned. Concomitant variables for the two series of analysis of co-variance would include two different kinds of individual teacher characteristics. The measures of individual teacher characteristics selected for the Series One analyses were two of the Process Scales (measures of the teacher's interpersonal functioning). The Series Two analyses would use the MTAI and a third Process Scale, Success Promotion.

The two process measures selected for Use in the Series One analyses were Aspy's Genuineness and Respect Scales[12] which had been derived from Carkhuff's scales for the Measurement of Congruence and Positive Regard.[13] The two scales utilize the teacher's vocal tone, choice of emotion words, and selected portions of the communication pattern to measure the level of interpersonal skills utilized in verbal interaction. Each scale defines five levels from 1.0 to 5.0 with intermediate ratings beyond the decimal point; e.g., 1.3 or 4.7. In effect, then, each is applied as a 40 point scale.

The Genuineness Scale measures the degree to which the teacher operates as an individual involved in person-to-person interactions rather than as a role functionary. It is based on a continuum from ritualistic to spontaneous communication with sub-continua of energy level and use of personal pronouns.

The Respect Scale measures the degree to which the teacher communicates to the students a positive regard for their abilities as individuals. It is based on a continuum from negative to positive regard with sub-continua of energy level and expectation level in terms of cognitive tasks.

These two measures were chosen on theoretical grounds as being two of the variables of interpersonal functioning which would contribute the most to teacher differences in the classes of behavior measured by Flanders' Interaction Analysis. Additionally, prior research with these scales had demonstrated

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[12] Aspy, D. N. Toward a Technology for Humanizing Education. Champaign, Illinois: Research Press, 1972.

[13] Carkhuff, R. R. Helping and Human Relations, Vol. I & II. New York: Holt, Rinehart and Winston, 1969.

positive relationships with some of the Flanders' Categories but had failed to show a significant relationship with grade level of the teacher.[14], [15]

Because the process measurements would be taken from the same behavior sample which was to be coded for Flanders' Interaction Analysis, an additional analysis which would include a different kind of measure of individual teacher characteristics was undertaken. The MTAI was chosen for the "different" concomitant variable because (1) it is a self-report rather than a process measure and (2) its scores can be considered as a measure of the "child-centeredness" of the teacher -- a patern of behavior which is compatible with that exhibited by teachers utilizing high levels of interpersonal skills.

The second concomitant variable for the Series Two analyses was a third Process Scale which was expected (on the basis of prior research[16]) to be a significant contributor to teacher behavior in the Flanders' Categories. This third Process Scale, Success Promotion, measures the degree to which the teacher promotes the success of the student in attaining his individual goals. It is based on a continuum from negative to positive attendance to student goals with sub-continua of directionality of class activities and response to student cues.

To test the co-variance assumption that the concomitant variable(s) is unaffected by the treatments (grade level), one-way analysis of variance was conducted for each of the co-variates. Table 19 displays the results and indicates that the lowest minimum significant probability was .218. Thus, the use of these variables as co-variates is permissible.

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[14] Aspy, D. N.; Black, Bob; and Roebuck, F. N. "The Relationship of Teacher-Offered Conditions of Respect to Behaviors Described by Flanders' Interaction Analysis." Journal of Negro Education, 41, No. 4 (Fall, 1972), 370-376.

[15] Aspy, D. N. and Roebuck, F. N. "The Relationship of Teacher-Offered Conditions of Genuineness to Behaviors Described by Flanders' Interaction Analysis." Educational Leadership, 1975. (In Press).

[16] Aspy, David N. and Hutson, B. A., "Promotion of Student Success," Journal of Educational Research, 66 (Oct., 1972) 57-60.

Table 19: Tests of Significance for Computed F's of One-Way Analysis of Variance of the Grade Level Means of the Concomitant Variables

Variables	F-Value*	Prob.	Grade Level Means							
			1	2	3	4	5	6	(7-9)	(10-12)
Respect	1.3728	0.218	2.93	2.79	2.79	2.77	2.79	2.76	2.75	2.78
Genuineness	1.2978	0.252	2.84	2.76	2.73	2.71	2.72	2.67	2.68	2.72
MTAI	1.1390	0.340	3.60	2.44	0.94	1.46	2.62	1.71	2.43	2.17
Success Promotion	1.3567	0.225	2.86	2.79	2.74	2.73	2.74	2.68	2.72	2.74
N			20	22	21	21	23	21	39	71

*DF = 7,230

RESULTS

From ANOVA

A series of 10 one-way analyses of variance were carried out using, in turn, the incidence of behaviors in each of the 10 Flanders' Interaction Analysis Categories as the dependent variable. Of the ten analyses, all but one reached acceptable levels of significance ($p < .05$) for rejection of the hypothesis that there were no differences among the treatment (grade-level) means. As evident in Table 20, the analysis for Flanders' Category 1 was the only one in which grade-level differences failed to reach significance.

In order to determine the source of the grade-level effects demonstrated in the analyses, Duncan's new multiple range test was carried out for each of the dependent variables. The results are summarized in the column on the far left of Table 20, with the significant comparisons being grouped by grade-level.

The major source of difference for each variable was one or more comparisons between secondary and elementary grade levels. For only one dependent variable (F-10), was a comparison within the secondary level a major source of variance. Significant comparisons within elementary grades were detected only for variables F-2 and F-4.

From Series One Analysis of Co-Variance

A series of 10 analyses of co-variance were carried out using, in turn, each of the Flanders' Interaction Analysis Categories as the dependent variable and a measure of Genuineness as concomitant variable 1 and a measure of Respect as concomitant variable 2. Again, in all but one of the ten analyses, it was possible to reject the hypothesis of no difference among the adjusted treatment means. The dependent variables concerned in the nine significant analyses were the same as in the first series. (See Table 21).

Although Duncan's new multiple range test was carried out for each of the dependent variables associated with the rejection of the null hypothesis, no new information was generated. The pattern of differences among the treatment means detected in the ANOVA series was merely repeated with no significant changes.

The tests of significance for the concomitant variables detected linear relationships at acceptable levels of probability between Respect and four of the dependent variables (F-3, F-4, F-7, and F-10). Genuineness, however,

Table 20: Tests of Significance for Computed F's of 10 One-Way Analyses of Variance for Grade-Level Effects on Flanders' Categories with Sources of Significance Indicated

Dependent Variable	Computed F+	Min. Signif. Probability	Summary of Sig. Comparisons Among Grade-Level Means*
F-1: Accepts Feelings	1.3678	.2199	- - - -
F-2: Praises	13.5094	.00001	7-12 ≠ 1-6 4 ≠ 1+2
F-3: Accepts Ideas	2.1169	.0427	10-12 ≠ 2+4
F-4: Asks Questions	17.6356	.00001	7-12 ≠ 1-6 4 ≠ 6
F-5: Lectures	17.1357	.00001	10-12 ≠ 1-9 7-9 ≠ 2+3
F-6: Gives Directions	12.1230	.00001	10-12 ≠ 1-9 1 ≠ 2-12
F-7: Criticizes	3.0292	.0046	10-12 ≠ 1-6
F-8: Student Responds	7.8654	.00001	10-12 ≠ 1-6
F-9: Student Initiates	4.0645	.00001	7-12 ≠ 1-6
F-10: Silence or Confusion	2.7714	.0088	7-9 ≠ 1-6 7-9 ≠ 10-12

+DF - 7,230

*Results of Duncan's New Multiple Range Test

- - - -No differences detected.

Table 21: Tests of Significance for Computed F's of 10 One-Way Analyses of Co-Variance for Grade-Level Effects on Flanders' Categories with Genuineness and Respect as Concomitant Variables (Series One)

Dependent Variable	Tests for	Computed F	Min. Signif. Probability
Flanders' Category 1	Adj. Treatment Means	1.6168	-- *
	Genuineness Regr. Coeff.	0.3856	--
	Respect Regr. Coeff.	0.5951	--
Flanders' Category 2	Adj. Treatment Means	13.0968	.00001
	Genuineness Regr. Coeff.	0.0859	--
	Respect Regr. Coeff.	3.4130	.0660
Flanders' Category 3	Adj. Treatment Means	2.1082	.0437
	Genuineness Regr. Coeff.	0.0518	--
	Respect Regr. Coeff.	4.1483	.0428
Flanders' Category 4	Adj. Treatment Means	18.1877	.00001
	Genuineness Regr. Coeff.	0.0618	--
	Respect Regr. Coeff.	9.8821	.0019
Flanders' Category 5	Adj. Treatment Means	18.4764	.00001
	Genuineness Regr. Coeff.	4.8905	.0280
	Respect Regr. Coeff.	0.0908	--
Flanders' Category 6	Adj. Treatment Means	11.9713	.00001
	Genuineness Regr. Coeff.	0.8191	--
	Respect Regr. Coeff.	0.8983	--
Flanders' Category 7	Adj. Treatment Means	3.6484	.0009
	Genuineness Regr. Coeff.	0.4026	--
	Respect Regr. Coeff.	5.3719	.0214
Flanders' Category 8	Adj. Treatment Means	8.0629	.00001
	Genuineness Regr. Coeff.	5.3644	.0215
	Respect Regr. Coeff.	1.7148	--
Flanders' Category 9	Adj. Treatment Means	5.6245	.00001
	Genuineness Regr. Coeff.	0.8803	--
	Respect Regr. Coeff.	0.6435	--
Flanders' Category 10	Adj. Treatment Means	2.7204	.0100
	Genuineness Regr. Coeff.	0.0311	--
	Respect Regr. Coeff.	8.7330	.0035

*Only probabilities less than .10 are reported; acceptable level of significance was $p < .05$.

DF = 7,228 for Adjusted Treatment Means
1,228 for Concomitant Variable 1
1,228 for Concomitant Variable 2

reached acceptable levels of significance for only two variables, F-4 and F-8.

From Series Two Analysis of Co-Variance

A second series of 10 one-way analyses of co-variance were carried out using, in turn, the Flanders' categories as the dependent variables with MTAI and Success Promotion scores as the concomitant variables. Of the ten analyses, seven reached acceptable levels of significance for rejection of the null hypothesis. As evident in Table 22, the analyses for Flanders' Categories 2, 4, 5, 6, 7, 8, and 9 were those in which grade-level effects reached significance.

Results from Duncan's new multiple range test were similar to those from the preceding two series of analyses. The major source of differences between the grade level means remained the comparisons between one or more levels of the secondary schools and one or more grades of the elementary school. The changes in the pattern were that slightly fewer comparisons resulted in the detection of significant differences. For example, the comparison for F-2 that grade 4 ≠ grades 1 and 2 (See Table 20) no longer held for this series of analyses.

In two of the 10 analyses, MTAI showed a linear effect at acceptable levels of probability. These were for dependent variables F-1 and F-3. The other concomitant variable, Success Promotion, evidenced strong linear relationships with 8 of the dependent variables.

From Examination of Regression Coefficients

An examination of the signs of the regression coefficients for the concomitant variables indicated that all but 5 of the 17 significant relationships with dependent variables were in theoretically expected directions. The twelve valid relationships were:

1. Respect was related positively with F-2 (Praise), F-3 (Acceptance of Ideas), F-4 (Asking of Questions) and negatively with F-7 (Criticism or Justification of Authority), and F-10 (Silence or Chaos).

2. MTAI was related positively with F-3.

3. Success Promotion was related positively with F-1 (Acceptance of Feelings), F-2, F-4, and F-9 (Student Initiates) and negatively with F-7 and F-10.

Table 22: Tests of Significance for Computed F's of 10 One-Way Analyses of Co-Variance for Grade-Level Effects on Flanders' Categories with Success Promotion and MTAI as Concomitant Variables (Series Two)

Dependent Variable	Tests for	Computed F	Min. Signif. Probability*
Flanders' Category 1	Adj. Treatment Means	1.4888	-- *
	MTAI Regr. Coeff.	5.0916	.0251
	Success Promotion Regr. Coeff.	9.7473	.0020
Flanders' Category 2	Adj. Treatment Means	12.7563	.00001
	MTAI Regr. Coeff.	0.3866	--
	Success Promotion Regr. Coeff.	16.7151	.0001
Flanders' Category 3	Adj. Treatment Means	1.8962	.0714
	MTAI Regr. Coeff.	9.1079	.0029
	Success Promotion Regr. Coeff.	20.2039	.00001
Flanders' Category 4	Adj. Treatment Means	16.1766	.00001
	MTAI Regr. Coeff.	2.4991	--
	Success Promotion Regr. Coeff.	27.1642	.00001
Flanders' Category 5	Adj. Treatment Means	17.3360	.00001
	MTAI Regr. Coeff.	0.6995	--
	Success Promotion Regr. Coeff.	8.7112	.0035
Flanders' Category 6	Adj. Treatment Means	12.5912	.00001
	MTAI Regr. Coeff.	0.3966	--
	Success Promotion Regr. Coeff.	0.0273	--
Flanders' Category 7	Adj. Treatment Means	3.3524	.0021
	MTAI Regr. Coeff.	0.3012	--
	Success Promotion Regr. Coeff.	6.9623	.0089
Flanders' Category 8	Adj. Treatment Means	7.2036	.00001
	MTAI Regr. Coeff.	0.1663	--
	Success Promotion Regr. Coeff.	0.4475	--
Flanders' Category 9	Adj. Treatment Means	5.1340	.00001
	MTAI Regr. Coeff.	1.8916	--
	Success Promotion Regr. Coeff.	8.0949	.0049
Flanders' Category 10	Adj. Treatment Means	2.1205	.0427
	MTAI Regr. Coeff.	3.5383	.0613
	Success Promotion Regr. Coeff.	38.4725	.00001

*Only probabilities less than .10 are reported; acceptable level of significance was $p < .05$.

DF = 7,228 for Adjusted Treatment Means
1,228 for Concomitant Variable 1
1,228 for Concomitant Variable 2

The five relationships in directions not expected were:

1. Genuineness was related positively to F-5 (Lecture) and negatively to F-8 (Student Responds).
2. MTAI was related negatively to F-1.
3. Success Promotion was related negatively to F-3 and positively to F-5.

DISCUSSION

In general, significant differences among the grade level means of Flanders' Categories were detected. Only one Flanders' Category (F-1) failed to register grade-level effects. This failure to register grade-level effects may be an artifact of the extremely small size of the response means due to the fact that many individuals had no occurrence of F-1 in their data. If F-1 had been treated as a dichotomous variable (present or not-present), perhaps a relationship might have been detected.

The detected grade-level effects seem to be much stronger and more stable in some categories than in others. The minimum significant probability for Categories 2, 4, 5, 6, 8, and 9 remained at approximately the same level in all three series while that of the other variables more readily reflected the effects of the concomitant variables. In Category 7, however, the fluctuation was minor.

SUMMARY

In conclusion, the findings from this study are:

1. Significant differences among the grade level means of Flanders' Categories were detected for all categories except F-1.
2. The sources of these grade-level differences were primarily a result of differences among the means of one or more of the levels of the secondary schools and one or more of the elementary grades.
3. Significant relationships were also detected between the concomitant and dependent variables.
4. The relationships with the co-variates were generally (but not always) in theoretically expected directions.

The implication of this study for applied research studies is that when Flanders' Categories are to be study variables and

the research involves teachers from several grade-levels, provision must be made for the effects of grade-level as a confounding variable. At a minimum, correction must be made for the effect of secondary versus elementary level membership.

STUDY NUMBER 4

GRADE-LEVEL CONTRIBUTIONS TO THE VARIATION OF COGNITIVE FUNCTIONING CATEGORIES

PURPOSE OF STUDY

This study asked two questions:

1. Is the grade-level at which the teacher instructs a significant contributor to differences among the means of Cognitive Functioning Categories?

2. When adjusted for appropriate measures of individual teacher characteristics, is there a significant difference among the grade level means of Cognitive Functioning Categories?

DESIGN

Sample

The sample for this study was the same as for Study No. 3. The bottom line of Table 23 displays the N by grade-level.

Data Collection

Data collection procedures were the same as for Study No. 3. The Cognitive Functioning Categories were coded from the same tape segments as the Flanders' Interaction Analysis Categories and the Process Scales.

For Cognitive Categories, the score recorded for each tape was the total number of 3-second periods tallied in each category during 12 minutes selected at random in four 3-minute segments. For the Respect scale, the data recorded for each teacher was the mean of the ratings for the four 3-minute segments. The data used in this analysis was the Teacher's Grand Mean for the year on each category or scale. Table 23 displays the grade-level means of the Cognitive Categories while Table 19 (cf. ante) lists the grade-level means for Respect and MTAI.

Table 23: Unadjusted Cognitive Means by Grade Level

Cognitive Categories	Grade Levels							
	1	2	3	4	5	6	Jr. Hi. (7-9)	Sr. Hi. (10-12)
C-1*	92.208	80.149	71.120	92.708	83.614	84.900	93.195	119.971
C-2	32.390	25.389	25.927	30.882	26.519	25.144	14.008	15.547
C-3	0.032	0.113	0.250	0.070	0.279	0.702	0.391	0.565
C-4	1.337	1.645	1.741	1.872	1.892	1.217	0.935	0.238
C-5	77.888	89.205	104.828	74.889	88.883	91.796	71.012	62.608
C-6	0.433	0.675	0.531	1.132	1.260	1.594	4.103	2.762
C-7	1.538	2.788	3.526	3.441	5.115	3.604	3.883	3.123
C-8	0.095	0.096	0.263	0.055	0.722	0.332	0.356	0.569
C-9	3.248	3.301	1.909	3.438	2.187	1.853	3.301	2.301
C-10	30.840	36.650	29.911	31.520	29.536	28.865	48.821	31.321
N	20	22	21	21	23	21	39	71

*See Table 24 for variable names

ANALYSIS

One series of one-way analysis of variance and one series of one-way analysis of co-variance were planned. The analysis of co-variance would use two different kinds of individual teacher characteristics as concomitant variables. The measures of individual teacher characteristics selected were the MTAI and the Respect scale (a measure of the teacher's interpersonal functioning).

Respect is one of a set of 5 Process Scales developed by Aspy[17] which utilize the teacher's vocal tone, choice of emotion words, and selected portions of the communication pattern to measure the level of interpersonal skills utilized in verbal interaction. Each scale defines five levels from 1.0 to 5.0 with intermediate ratings beyond the decimal point; e.g., 1.3 or 4.7. In effect, then, each is applied as a 40 point scale.

The Respect Scale measures the degree to which the teacher communicates to the students a positive regard for their abilities as individuals. It is based on a continuum from negative to positive regard with sub-continua of expectation level in terms of cognitive tasks and energy level.

Respect was chosen on theoretical grounds as being the one variable of interpersonal functioning which would contribute the most to teacher differences in the classes of behavior measured by the Cognitive Categories. Additionally, prior research with this scale had demonstrated positive relationships with some of the Cognitive Categories but had failed to show a significant relationship with grade level of the teacher.[18, 19]

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[17] Aspy, D. N. Toward a Technology for Humanizing Education. Champaign, Illinois: Research Press, 1972.

[18] Aspy, D. N.; Black, Bob; and Roebuck, F. N. "The Relationship of Teacher-Offered Conditions of Respect to Behaviors Described by Flanders' Interaction Analysis." Journal of Negro Education, 41, No. 4 (Fall, 1972), 370-376.

[19] Aspy, D. N. and Roebuck, F. N. "An Investigation of the Relationship Between Student Levels of Cognitive Functioning and the Teacher's Classroom Behavior." Journal of Education Research, 65 (April, 1972), 365-368.

Because the process measurement would be taken from the same behavior sample which was to be coded for Cognitive Categories, a different kind of measure of individual teacher characteristics was selected for the second concomitant variable. The MTAI was chosen as the "different" co-variate because (1) it is a self-report rather than a process measure and (2) its scores can be considered as a measure of the "child-centeredness" of the teacher -- a pattern of behavior which is compatible with that exhibited by teachers utilizing high levels of interpersonal skills.

Analysis of variance for the effect of treatments (grade-level) on the concomitant variables was performed in Study No. 3. Both MTAI and Respect were tested at that time. Table 19 (cf. ante) displays the results.

RESULTS

From ANOVA

A series of 10 one-way analyses of variance were carried out using, in turn, the incidence of behaviors in each of the 10 Cognitive Categories as the dependent variable. Of the ten analyses, six reached acceptable levels of significance ($p < .05$) for rejection of the hypothesis that there were no differences among the adjusted treatment (grade-level) means. As evident in Table 24, the analyses for Categories C-3, C-4, C-7, and C-9 were those in which grade-level differences failed to reach significance.

In order to determine the source of the grade-level effects demonstrated in the analyses, Duncan's new multiple range test was carried out for each of the dependent variables. The results are summarized in the column on the far left of Table 24, with the significant comparisons being grouped by grade-level.

Although the major source of differences between the grade level means were the comparisons between one or more levels of the secondary schools and one or more grades of the elementary school, there were significant differences for four variables (C-1, C-2, C-5, and C-8) within the elementary grades. Significant comparisons between secondary levels were detected only for variables C-1 and C-10.

From Analysis of Co-Variance

A series of 10 analyses of co-variance were carried out using, in turn, each of the Cognitive Categories as the dependent variable and a measure of Respect as concomitant variable 1 and MTAI scores as concomitant variable 2. (See Table 25). In seven of the ten analyses, it was possible to

Table 24: Tests of Significance for Computed F's of 10 One-Way Analyses of Variance for Grade-Level Effects on Cognitive Functioning Categories with Sources of Significance Indicated

Dependent Variable	Computed F+	Min. Signif. Probability	Summary of Sig. Comparisons Among Grade Level Means*
C-1: Teacher Recalls Facts	12.6903	.00001	10-12 ≠ 1-6, 7-9 3 ≠ 1,4, 7-9
C-2: Teacher Asks for Facts	21.1849	.00001	7-12 ≠ 1-6 1 ≠ 2,3,5,6 4 ≠ 6
C-3: Teacher Thinks	1.9266	.0663	- - - -
C-4: Teacher Asks for Thinking	1.0583	.3914	- - - -
C-5: Student Recalls Facts	6.6554	.00001	10-12 ≠ 2,3,5,6, 3 ≠ 1,4, 7-9
C-6: Student Asks for Fact	12.9114	.00001	7-12 ≠ 1-6
C-7: Student Thinks	1.0935	.3681	- - - -
C-8: Student Asks for Thinking	3.0181	.0047	5 ≠ 1,2,4 4 ≠ 10-12
C-9: Non-Cognitive Behavior	1.3044	.2490	- - - -
C-10: Silence or Confusion	3.0519	.0043	7-9 ≠ 1-6, 10-12

+DF = 7, 230

*Results of Duncan's New Multiple Range Test

- - - - No difference detected

Table 25: Tests of Significance for Computed F's of 10 One-Way Analyses of Co-Variance for Grade Level Effects on Cognitive Categories with Respect and MTAI as Concomitant Variables

Dependent Variable	Tests for	Computed F	Min. Signif. Probability
Cognitive Category 1	Adj. Treatment Means	12.9608	.00001
	Respect Regr. Coeff.	12.3681	.0005
	MTAI Regr. Coeff.	0.9545	-- *
Cognitive Category 2	Adj. Treatment Means	20.3062	.00001
	Respect Regr. Coeff.	34.8379	.00001
	MTAI Regr. Coeff.	3.9059	.0494
Cognitive Category 3	Adj. Treatment Means	2.3632	.0240
	Respect Regr. Coeff.	0.8428	--
	MTAI Regr. Coeff.	0.3498	--
Cognitive Category 4	Adj. Treatment Means	1.0571	--
	Respect Regr. Coeff.	14.3780	.0002
	MTAI Regr. Coeff.	0.0613	--
Cognitive Category 5	Adj. Treatment Means	5.3519	.00001
	Respect Regr. Coeff.	0.5900	--
	MTAI Regr. Coeff.	0.0769	--
Cognitive Category 6	Adj. Treatment Means	11.8814	.00001
	Respect Regr. Coeff.	0.1502	--
	MTAI Regr. Coeff.	0.7597	--
Cognitive Category 7	Adj. Treatment Means	1.7519	.0985
	Respect Regr. Coeff.	14.0689	.0002
	MTAI Regr. Coeff.	0.0208	--
Cognitive Category 8	Adj. Treatment Means	2.9709	.0054
	Respect Regr. Coeff.	0.0692	--
	MTAI Regr. Coeff.	0.1185	--
Cognitive Category 9	Adj. Treatment Means	1.1029	--
	Respect Regr. Coeff.	0.3553	--
	MTAI Regr. Coeff.	0.0370	--
Cognitive Category 10	Adj. Treatment Means	2.3599	.0242
	Respect Regr. Coeff.	45.3410	.00001
	MTAI Regr. Coeff.	2.1674	--

*Only probabilities less than .10 are reported; acceptable level of significance was $p < .05$.

DF = 7,228 for Adjusted Treatment Means
1,228 for Concomitant Variable 1
1,228 for Concomitant Variable 2

reject the hypothesis of no difference among the adjusted treatment means. The ANOVA series had detected significant differences for only 6 variables. The new variable in which grade level differences were detected was C-3. The significant comparisons among the treatment means for C-3 were: 1 ≠ 6 or 10-12; 6 ≠ 4.

Changes from unadjusted to adjusted grade level means resulted in some slight changes in the significant comparisons* among the means for some variables. These changes were:

For C-1, the adjusted mean of secondary level 10-12 was no longer different from 7-9.

For C-2, adjusted mean of 4 was not different from 3 but was different from 6.

For C-6, adjusted means 10-12 ≠ 7-9.

For C-8, adjusted mean of 4 was not different from 5.

The tests of significance for the concomitant variables detected linear relationships at acceptable levels of probability between Respect and five of the dependent variables (C-1, C-2, C-4, C-7, and C-10). All five relationships were in theoretically expected directions. Two of these relationships were for variables in which grade level differences at acceptable levels were not detected. That is, only the teacher's Respect for students was significantly related to C-4 (Teacher Calls for Thinking) and C-7 (Student Thinks).

DISCUSSION

In general, significant grade-level effects on the variance of Cognitive Functioning Categories were detected. Three Categories (C-4, C-7, C-9) failed to register grade-level effects. For categories C-4 and C-7, this may be related to the strong relationships with Respect. The failure of C-9 to show grade-level differences may be an effect of the nature of the variable in that it has no distinctive characteristic. That is, it serves as an escape or catch-all category for behaviors not classifiable as to level of cognitive functioning. For example, many behaviors which register in Flanders' Categories 1, 3, 6, 7, and 9 may be classified as C-9 on the Cognitive Functioning instrument.

Contrary to expectations, the largest means for student and teacher "thinking" behavior were not at the seondary levels.

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*Results of Duncan's New Multiple Range Test.

For unadjusted C-3 (Teacher Thinks), the largest means were registered by grade 6, Senior High (10-12), and Junior High (7-9), in that order. When the means were adjusted for Individual Teacher Characteristics, the mean for the Jr. Hi. moved to fourth place while 5th grade took third position. In C-7 (Student Thinks), the three highest unadjusted means were achieved by grade 5, Jr. Hi., and grade 6, in that order, while the Sr. Hi. (10-12) was the third lowest mean. (It was higher than grades 1 and 2). In the adjusted means, grade 6 is replaced in third position by grade 3.

SUMMARY

In conclusion, the findings from this study are:

1. Significant differences among the grade level means of Cognitive Functioning Categories were detected for all categories except C-4, C-7, and C-9.

2. The sources of these grade-level differences were primarily a result of differences among the means of one or more of the levels of the secondary school and one or more of the elementary grades.

3. There were significant differences among the means of the elementary grades for variables C-1, C-2, C-5, and C-8.

4. There were significant differences between the two levels of secondary schools for variables C-1 and C-10.

5. Significant relationships were also detected between concomitant and dependent variables.

6. The relationships of the dependent variables with Respect were in theoretically expected directions, but that between MTAI and C-2 was not.

The implication of this study for applied research studies is that when Cognitive Functioning Categories are to be study variables and the research involves teachers from several grade-levels, provision must be made for the effects of grade-level as a confounding variable. At a minimum, some consideration must be made of the effect of secondary versus elementary school membership. The effect of grade level differences among the elementary grades is more critical for the Cognitive Functioning Categories than for Flanders' Interaction Analysis.

STUDY NUMBER 5

SUBJECT MATTER CONTRIBUTIONS TO THE VARIANCE OF CLASSROOM FUNCTIONING VARIABLES

PURPOSE OF STUDY

This study posed the question:

Is the subject matter which the Junior or Senior High School teacher presents a significant contributor to differences among the means of Classroom Functioning as measured by Flanders' Interaction Analysis Categories, Cognitive Functioning Categories, and Process Scales?

DESIGN

Sample

The sample for this study consisted of Year 01 Junior or Senior High School teachers who submitted a tape for the month of March, 1972. Total N was 89. The bottom line of Table 27 displays the N by Subject Matter and Grade-level groups.

Data Collection

Data for the study consisted of the individual's scores on 10 Flanders' Interaction Analysis Categories, 10 Cognitive Functioning Categories, and 5 Process Scales. The data was collected through the normal procedures for assessment of tape data described in Part I.

The month from which data was to be taken for this analysis was chosen through random number procedures from all months available for Year 01, exclusive of May, 1971 and May, 1972 which were reserved for analyses using pre and post test data. The study was restricted to data from one month to avoid contamination from time-of-year. (See Study No. 6).

ANALYSIS

Twenty-five two-way analyses of variance were conducted, using in turn each of the Flanders', Cognitive, and Process scores as the dependent variable. Factors were grade-level

on which the teacher instructed and subject matter presented. Grade level was included as a factor on the basis of results from Studies 3 and 4.

There were two grade-level groups: (1) Junior High, grades 7-9 and (2) Senior High, grades 10-12. Subject matter groups were: (1) Math, (2) English, (3) Social Sciences, (4) Science and (5) Applied Subjects. "Applied Subjects" included such courses as Home Economics, Vocational Education, Business Education, Shop, etc.

RESULTS

Table 26 presents the results of the 25 analyses. It lists by source of variation all significance levels less than .10 which were detected.

Only 7 variables reached this level of significance for any source of variation. Table 27 presents the means by Grade and Subject Matter groups for these 7 variables.

Subject matter had a significant main effect for only three variables, F-3, C-3, and C-6. Of these, F-3 was not at the acceptable ($p < .05$) level.

Two variables (F-9 and C-3) achieved significant grade-by-subject matter interactions. The cell means for these variables are presented in Table 28.

DISCUSSION

With only two out of 25 analyses yielding subject matter as a significant source of variation at the .05 level, the conclusion drawn by the researchers was that subject matter was not an important enough confounding variable to cause problems within the scope of the present study. Grade level was again found to have an important effect on the study variables.

The occurrences of cell means of absolute zero for C-3 in Table 28 proved of much interest to the researchers. Examination of the raw data for this variable showed that the means for the non-zero cells were accounted for by 6 of the 9 Sr. High Math teachers, 4 of the 18 Sr. Hi. Applied Subjects teachers, and 3 of the 16 Sr. Hi. English teachers. Altogether, these 11 teachers achieved a total of 54 3-second intervals of Thinking behavior during the 132 minutes coded at random from their tapes (12 minutes from each tape). Since the instructional hour for these teachers was 50 minutes long, multiplying by 4.16 (the number of 12 minute periods in 50

Table 26: Significance Levels Less Than .10 by Sources of Variation for 25 Two-Way Analysis of Variance by Grade and Subject Matter for Classroom Functioning Variables

	Grade	Subject Matter	G X S	Significant Grade Comparisons	Sources of Significance for Subject Matter*
F-1					
F-2	--	--			
F-3	--	.0731			Applied Subjects < Math and Social Studies
F-4	--	--			
F-5	.0381	--		7-9 < 10-12	
F-6	--	--			
F-7		--			
F-8		--			
F-9		--	.0316		
F-10		--			
C-1					
C-2					
C-3	.0489	.0006	.0022	7-9 < 10-12	Math > all others
C-4	.0543			10-12 < 7-9	
C-5					
C-6	.0128	.0030		10-12 < 7-9	Math and Science > others
C-7					
C-8					
C-9					
C-10	.0453			10-12 < 7-9	
M					
G					
SP					
R					
SI					

*Results of Duncan's New Multiple Range Test.

Table 27: Means for Variables in which Significant Differences by Grade, Subject Matter or GXS Interactions were Detected

Variables	Means++ by Grade		Means++ by Subject Matter Taught				
	7-9	10-12	Math	English	Social Sciences	Science	Applied Subjects*
F-5: Teacher Lectures	93.55	119.07	121.25	115.56	93.86	83.83	118.45
F-9: Student Initiates	14.52	10.54	14.38	10.88	12.14	11.42	11.83
C-3: Teacher Thinks	0.0+	0.96	2.94	0.12	0.0+	0.0+	0.18
C-4: Teacher Calls For Thinking	1.97	0.48	2.56	1.32	1.14	0.0+	0.09
C-6: Student Asks For Facts	4.00	1.82	5.18	1.60	1.93	5.08	1.05
C-10: Silence or Confusion	56.18	36.48	47.06	32.76	55.21	46.00	45.13
N	33	56	16	25	14	12	22

*Home Economics, Vocational Education, Business Education, Shop, etc.

++Data is reported as total number of 3-second intervals coded in category during 12 minutes selected at random in four 3-minute segments from a one-hour tape.

+Absolute zero. No occurrence of variable for any member of this group in segments coded.

Table 28: Rank Order of Means for Significant Grade by Subject Matter Interactions

F-9: Student Initiates			C-3: Teacher Thinks		
Mean	Group	N	Mean	Group	N
30.75	Jr. Hi. Applied Subjects	4	5.22	Sr. Hi. Math	9
22.83	Sr. Hi. Social Studies	6	0.22	Sr. Hi. Applied Subjects	18
17.14	Jr. Hi. Math	7	0.18	Sr. Hi. English	16
16.78	Jr. Hi. English	9	0.0	Jr. Hi. Math	7
12.22	Sr. Hi. Math	9	0.0	Jr. Hi. English	9
12.14	Sr. Hi. Science	7	0.0	Jr. Hi. Social Sciences	8
10.40	Jr. Hi. Science	5	0.0	Sr. Hi. Social Sciences	6
7.61	Sr. Hi. Applied Subjects	18	0.0	Jr. Hi. Science	5
7.56	Sr. Hi. English	16	0.0	Sr. Hi. Science	7
4.12	Jr. Hi. Social Science	8	0.0	Jr. Hi. Applied Subjects	4

minutes) provides an estimate of the total amount of C-3 occurring in the tapes of these 11 teachers.

This estimate indicates that out of the 89 class hours of instruction represented by the tapes submitted by secondary teachers during the second week of March, 1972, students were exposed to models of thinking behavior for slightly less than 12 minutes. And, then, only if they attended the class of one of 11 particular teachers was thinking behavior exhibited to them.

That this is not an unusually or exceptionally low incidence of C-3 is borne out by data from another study[20] in which 607 hours of instruction supplied by 98 secondary teachers yielded a mean for C-3 of 0.52. This is approximately 1½ seconds of C-3 for every tape coded or a total of a little less than 16 minutes for all 607 tapes. Using the estimation procedure (multiplying coded quantity by 4.16), the estimate of total C-3 in 607 hours of secondary instruction is 1 hour and 6 minutes.

The rest of the study variables were examined for frequently occurring cell means of zero. Variables F-1 and F-2 were found to have zero means for all cells except that of Senior High English. Examination of the raw data indicated that the non-zero mean for both these variables was accounted for by the behavior of one teacher who had scored one 3-second interval each of F-1 (Accepting Student Feelings) and F-2 (Giving Praise).

SUMMARY

In conclusion, the findings of this study include:

1. The subject matter presented by the teacher was a significant ($p < .05$) source of variation only for variables C-3 (Teacher Thinks) and C-6 (Student Asks for Facts).

2. For both variables, Math teachers attained the highest mean. For C-6, Science teachers scored a mean slightly lower than, but not different from, that of the Math teachers.

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[20] Roebuck, F. N. and Aspy, D. N. Response Surface Analysis: Interim Report #3. Monroe, LA: National Consortium for Humanizing Education, Northeast Louisiana University (National Institute of Mental Health Research Grant No. 5 P0 1 MH 19871), 1974.

3. Significant grade-by-subject matter interactions were detected for F-9 (Student Initiates) and C-3.

4. Largest means for F-9 were attained by teachers of Jr. Hi. Applied Subjects and Sr. Hi. Social Sciences; for C-3 the highest mean was that of the Sr. Hi. Math teachers.

5. Of the 89 class hours of instruction represented by the tapes submitted during the second week of March, 1972, students were exposed to models of thinking behavior for slightly less than 12 minutes. This is a total, not a mean, and is the sum of behaviors by 11 of the 89 teachers; the other 78 teachers registered no occurrences of C-3 (Teacher Thinks).

Since only two out of 25 analyses yielded significant differences among the subject matter means at the .05 level, the implication for the applied research studies was that subject matter was not an important enough confounding variable to cause problems within the scope of the present study.

STUDY NUMBER 6

SIXTH DEGREE ORTHOGONAL POLYNOMIAL MULTILINEAR REGRESSION ANALYSIS FOR TRENDS ACROSS TIME AMONG CLASSROOM FUNCTIONING VARIABLES

PURPOSE OF STUDY

This study posed two questions:

1. Will sixth degree orthogonal polynomial multilinear regression analysis yield significant non-linear trends across time among Classroom Functioning Variables (as measured by Flanders' Interaction Analysis Categories, Cognitive Functioning Categories, and Process Scales) for Control (No-Training Condition) groups and/or for Experimental (Training Condition) groups?

2. Are the trends for the Experimental groups different from those of the Control groups?

DESIGN

Sample

The sample for this study consisted of all Year 01 teachers who submitted 6 or more tapes, two of which were the September, 1971 and May, 1972 tapes. Total N for the study was 234. Table 29 displays the N by grade-level groups within treatment conditions.

Data Collection

Data for the study was the individual's score for each tape (month) on each of 10 Flanders' Interaction Analysis Categories, 10 Cognitive Functioning Categories, and 5 Process Scales. The data was collected by the regular procedures for assessment of tape data described in Part I.

ANALYSIS

The levels of the independent variable for this analysis were the nine months of the school year from September, 1971 to May, 1972 during which tapes were obtained from teachers

Table 29: Teacher Sample for Trend Analysis by Grade Level Groups Within Treatment Conditions

	Grade Level Groups	Number of Teachers	
		Control	Experimental
	1	9	11
	2	12	10
	3	11	10
	4	11	10
	5	11	12
	6	10	11
	7-9	11	26
	10-12	29	40
Totals	1-6	64	64
	7-12	40	66
	1-12	104	130

at monthly intervals. The procedure used was a sixth-degree orthogonal polynomial multilinear regression analysis across time (months). Each regression coefficient was computed* independently of the others and each was tested for significance at the $p < .05$ level. If more than three coefficients were significant, they were eliminated on the basis of R^2 until only the three components achieving the highest R^2 remained. The resulting regression equation was used to generate the curve representing the trend of the behavior across time.

This procedure was repeated for each of the 25 study variables for each of the groups within each of the conditions. Since there were 10 groups (Grades 1, 2, 3, 4, 5, 6, all Elementary, grades 7-9, grades 10-12, All Secondary) for each of two conditions (Control and Experimental) for each of 25 variables, a total of 500 regressions were completed.

RESULTS

From Control Group Data

A question of some concern to the researchers was whether time of year might be a confounding factor for the study variables. Thus, the analyses of most interest in this study were those utilizing the data from the control groups. Table 30 displays the significant components of the polynomial expressions of the fitted curves for each analysis in which a significant trend was detected in the control data. Of the 250 analyses conducted with this data, 79 significant trends were detected. Twenty-four of these were in the 50 analyses with the data from School Level groups (All Elementary and All Secondary). When the teachers in the School Level groups were treated separately in grade level groups, the resulting 200 analyses yielded 55 significant trends with 41 occurring among the elementary grades and 14 occurring among the secondary groups.

Of the 79 significant trends, 70 were fitted with polynomial expressions which contained a linear term; 57 had a cubic component, and 32 had a quartic component. The majority of the curves had a decreasing function. (See further discussion below).

Three major forms of fitted curves occurred in this data. They are represented in Figure 4. The most commonly fitted curve was one with both linear and cubic terms. Thirty-nine curves were of this form but 14 of those had an added 5th

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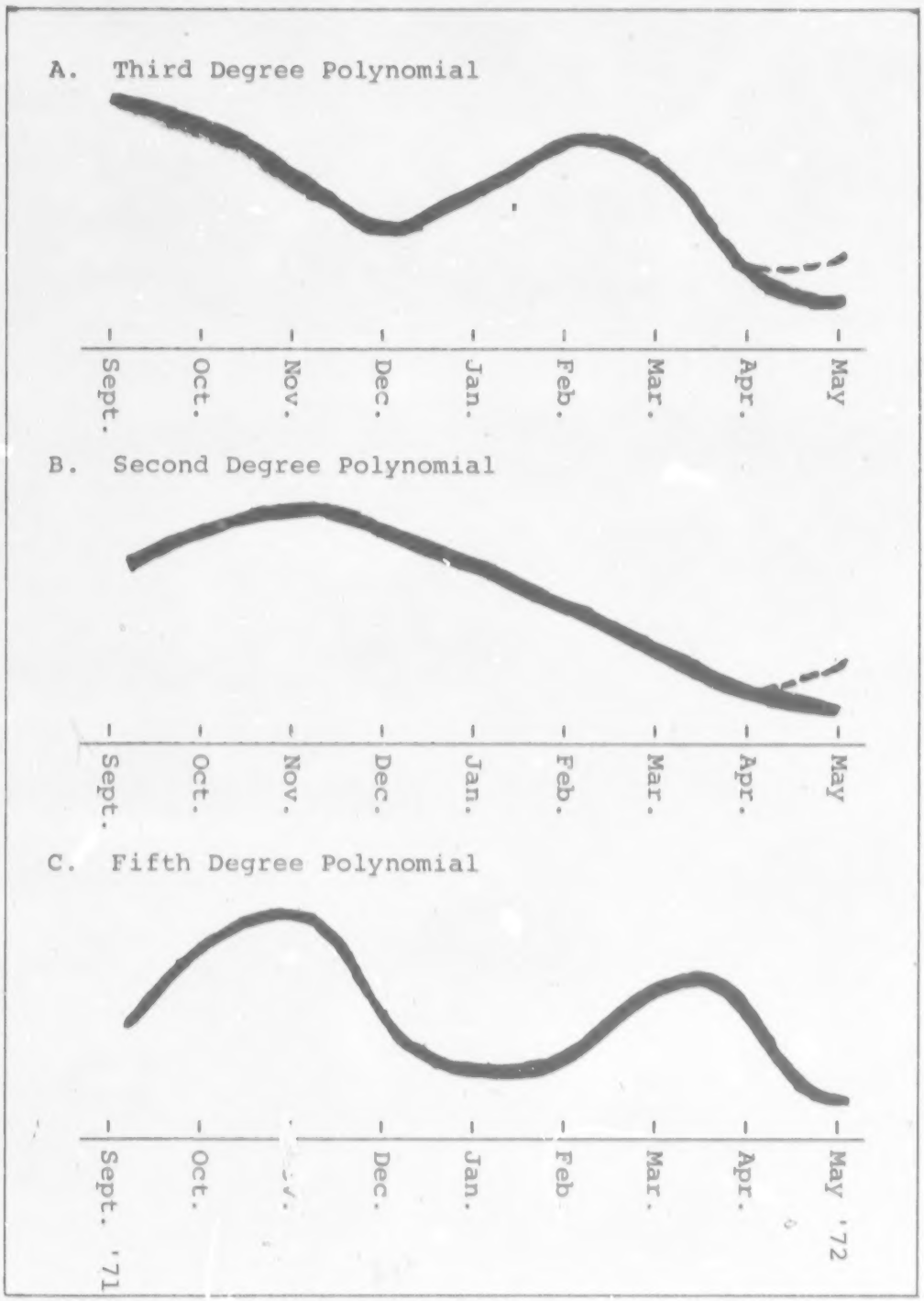
*Using procedures to compensate for unequal N of observations at time points.

Table 30: Significant Components of the Polynomial Expressions for Significant Trends Detected in Control Group Data

	By School Level		By Grade Level Groups							
	All Elem.	All Sec	1	2	3	4	5	6	7-9	10-12
F-1	2,3,5	--	--	--	--	--	1,2,3	--	--	--
F-2	1,3,5	--	--	1,3,5	--	1,3	1,3,5	--	--	--
F-3	1,4,5	1,3	--	--	--	1,2,4	1,3,5	--	--	1,3
F-4	1,2,3	--	--	--	1,2	--	--	1,4	--	--
F-5	--	--	--	--	--	--	--	--	--	--
F-6	1,3,5	1,3,5	--	--	--	--	--	--	2,3,5*	--
F-7	--	--	--	--	--	--	--	--	--	--
F-8	1,3	--	1,3	--	--	--	--	--	--	--
F-9	--	--	1 *	--	--	--	--	--	--	--
F-10	1,3,5	--	--	--	--	--	--	--	--	1,3,5*
C-1	2,3,6	--	--	--	--	--	--	--	--	--
C-2	1,2,3	1,3	--	1,2,3	1,2	--	1,3	1,2,6	--	1,2,3
C-3	--	--	--	--	--	--	--	--	--	--
C-4	--	--	--	--	--	--	--	--	--	--
C-5	1,3	--	1,3	--	1,3,5	--	--	--	--	--
C-6	--	2,4,6 *	1,2	3	--	1,3 *	--	--	--	2,3,5*
C-7	--	--	--	--	1,3	--	--	--	--	--
C-8	--	--	--	--	--	--	--	--	--	--
C-9	--	--	1,3,5*	--	--	--	--	--	--	--
C-10	--	--	--	--	--	--	--	--	--	--
M	1,3	2,3	--	1,2	--	1,2	1,3,5	--	2,3,5	1,2
G	1,3	1,2,3	1,3	1,3	1,3,4	1,3	1,3,5	--	2,3,5	1,2
SP	1,3	1,2		--	1,2,3	1,2	1,3,4	--	1,2	1,2
R	1,3	1,3	1,2	--	1,3,5	1,2	1,3,4	1,2	1,2	1,3
SI	1,3	1,3	1,2	--	1,3,5	1,3	1,3	--	--	1,3

* = in same direction as the expected direction of treatment benefits for Experimental Groups

Figure 4: General Forms of Commonly Occurring Significant Negative Trends in Control Group Data



degree component. (When compared with observed data, this quintic component usually occurred when there had been an April or May "recovery" from a decreasing function). Twenty-two trends were expressed with linear and quadratic components and 8 of these included a cubic term. (Again, this cubic term was associated with "recovery" from decreasing function in the observed data). The third repeated form was that of a fifth degree polynomial expression with the linear and quartic terms eliminated as insignificant. This form occurred five times and four of these were in the secondary grade-level groups (7-9 and 10-12).

From Experimental Group Data

Table 31 displays the significant polynomials of the fitted curves for each analysis in which a significant trend was detected in the data from Experimental groups. Of the 250 analyses conducted with this data, 97 significant trends were detected. Twenty-eight of these were in the 50 analyses with the data from School Level groups (All Elementary and All Secondary). When the teachers in the School Level groups were treated separately in grade level groups, the resulting 200 analyses yielded 69 significant trends with 38 occurring among the elementary grades and 31 occurring among the secondary groups.

Of the 97 significant trends, 46 were fitted with polynomial expressions which contained a linear term; 70 had a quadratic component, and 68 had a cubic component. About half of the curves had a decreasing function. (See further discussion below).

The forms of the fitted curves were not as consistent in the Experimental Data as in the Control data. However, of the 38 significant positive trends (in the direction* of anticipated treatment benefits) two general forms of fitted curves occurred commonly. They are represented in Figure 5. The arrows in the figure represent those points in time at which treatment (training of teachers) was applied. The most commonly fitted curve was one with both quadratic and cubic terms. Nineteen curves had this form, but 12 of those were cases in which the quadratic and cubic terms were components of a 5th or 6th degree expression. The second generally occurring form in this data was that of a 5th or 6th degree

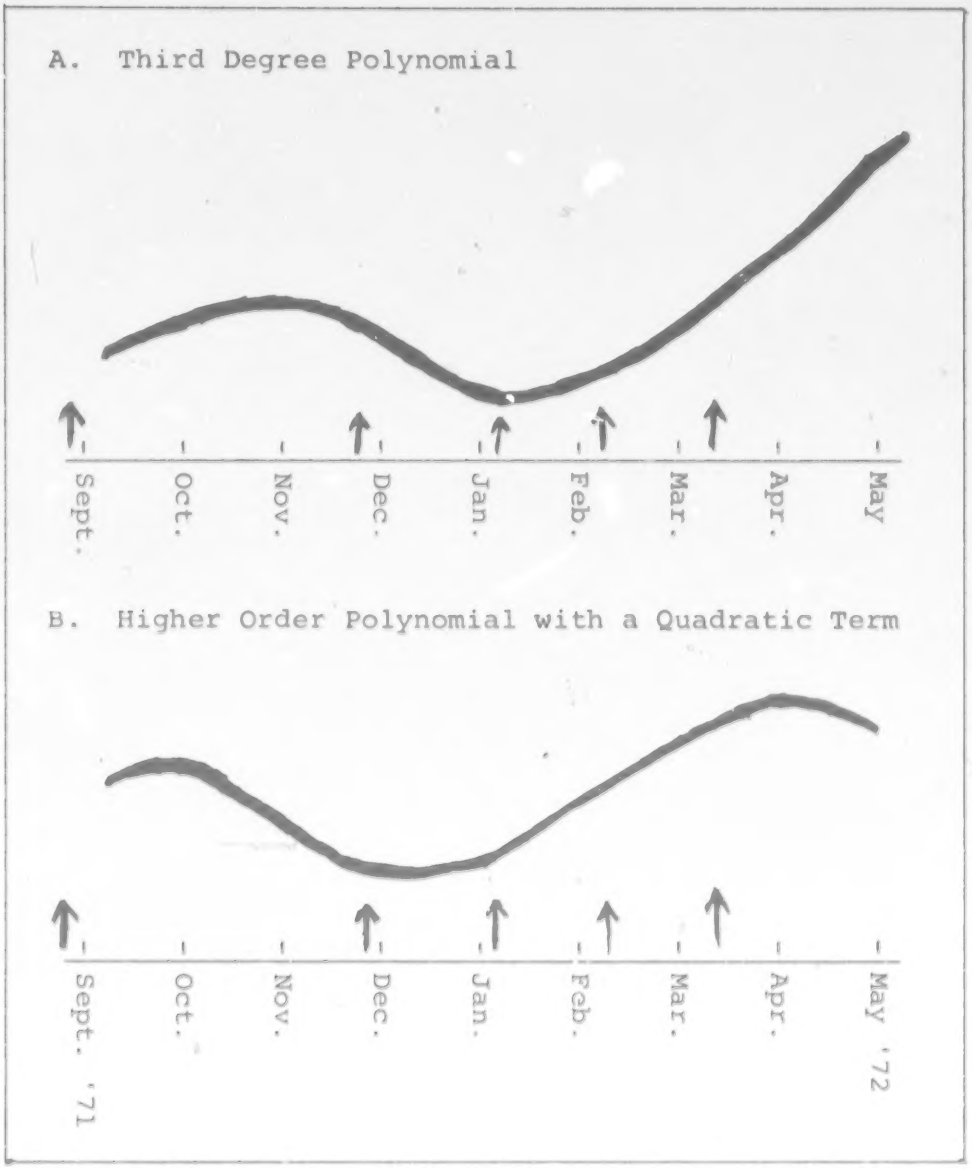
*Either an increasing or a decreasing function, depending upon whether high or low levels of the specific behavior were desired treatment benefits. Positive directions are indicated in Table 31 by a +.

Table 31: Significant Components of the Polynomial Expression for Significant Trends Detected in Experimental Group Data

	By School Level		By Grade Level Groups							
	All Elem.	All Sec.	1	2	3	4	5	6	7-9	10-12
F-1	--	--	--	--	--	--	--	--	1,2,3+	1,2,3
F-2	1,3,5+	1,2,3+	--	3,5,6+	2,3,5+	--	1,3,5+	2,3,6+	--	2,3,6+
F-3	--	1,2,3	--	--	2,5,6+	--	--	--	--	--
F-4	1,2,6	1,3,4	--	--	--	--	--	--	--	2,5
F-5	1,2,6	--	--	2,3,5+	--	--	--	--	2,3,4	--
F-6	--	3,4 +	3,4	1,2,3	1,3 +	1,2,3+	2,3,6	2,3,5	1,2,3+	1,2,3
F-7	--	--	--	--	--	--	--	1,2,3	3,4,5	--
F-8	2,3,5	--	1,3	3,5,6	--	--	1,2,6	--	2,3,4	--
F-9	--	--	--	--	--	--	--	--	--	3,5,6+
F-10	2,3,5	1,6	--	2,3,6+	--	--	--	1,2,3+	1,2,3	2,5,6+
C-1	1,2,6	--	1,3,5	2,3,5	1,2,3	--	--	--	2,3,4	--
C-2	1,3,6+	1,6	--	2,3,5	--	--	2,3,5+	--	--	2,3
C-3	--	--	--	--	--	--	--	--	--	--
C-4	--	1,5,6	--	--	--	--	--	--	1,2,3	2,3,5
C-5	2,3,6	--	1,2,3	3,5,6	--	--	--	--	2,3,4	--
C-6	--	--	--	--	--	--	--	--	--	--
C-7	--	1,2,3	--	--	1,2,3	2,3,4	--	--	--	1,2,4
C-8	--	--	--	--	--	--	--	--	--	2,3,5
C-9	--	--	--	--	--	--	--	--	1,2,3+	--
C-10	2,4,6	3,5,6	--	--	--	--	--	1,5,6+	1,2,3	2,5,6
M	1,2,3+	3,4	--	--	--	2,3,5+	--	1,2,4+	2,3,4	1,2,3
G	1,2,6+	3,4	--	--	2,3,5+	2,3,5+	--	1,4 +	2,3,4	2,4,5
SP	1,2,5+	4	2,3,5+	--	2,3,5+	--	--	1,4 +	2,3,4	1,2,4
R	1,2,5+	4	--	--	--	2,4,6+	--	--	2,3,4	3,5,6
SI	1,2,5+	4	--	1,2,5+	1,2,3+	--	--	--	3,4,5	--

+ = in expected direction of treatment benefit

Figure 5: Two General Forms of Commonly Occurring Significant Positive Trends in Experimental Group Data With Applications of Treatment Indicated



polynomial expression which included a significant quadratic component as one of three terms. This form occurred 8 times.

From Comparison of Control versus Experimental Trends

The trends for each dependent variable were compared for each of the grade-level groups. Of the 400 trend analyses carried out with data from grade-level groups, the regression was significant in 124 cases. These cases were so distributed that at least one regression of the pair was significant in 102 of a possible 200 paired comparisons (the comparison of the trend of a behavior variable in grade-level matched experimental vs. control groups).

Table 32 displays the results of the comparison. The symbols used are defined in the table; but, to summarize, the "+" and "-" symbols denote the direction of the behavior trends while the letters and numbers indicate significance. Specifically, a "+" denotes a favorable comparison; i.e., one in which it can be considered that the Experimental group has moved in the expected direction of treatment benefit as indicated by (1) a significant positive trend of the experimental group paired with either a significant control group trend in the opposite direction or with a non-significant control group in the same or opposite direction or (2) a non-significant positive trend of the experimental group paired with a significant control group trend in the opposite direction.

Similarly, a "-" denotes an unfavorable movement of the Experimental group away from the expected direction of treatment benefit as indicated by (1) a significant negative trend of the experimental group paired with either a significant control group trend in the positive direction or with a non-significant control group trend in the same or opposite directions or (2) a non-significant negative trend of the experimental group paired with a significant control group trend in a positive direction.

The letters "ND" indicate that both trends were in the same direction. A "+X" or "-X" standing alone or with the letters "ND" indicates that only the experimental trend was significant. The letter "C" immediately following the directional symbol ("+" or "-") indicates that only the control trend was significant while the number "2" following the directional symbol indicates that both the control and the experimental trends were significant.

The incidence of favorable and unfavorable comparisons are summed by grade-level groups in Table 33. Elementary Teachers have more favorable than unfavorable comparisons (44 to 23) while the Secondary teachers have more unfavorable ones.

Table 32: Summary of 6-Degree Polynomial Multilinear Regression Analysis Across Time -- Direction & Treatment Assignment of Significant Behavior Trends for 200 Paired Analyses of Experimental & Control Grade-Level Groups

Variables	Elementary Schools by Grade						Secondary by Grade	
	1	2	3	4	5	6	7-2	10-12
F-1	--	--	--	--	+C	--	+X	-XND
F-2	--	+2	+X	+C	+2	+X	--	+X
F-3	--	--	+X	+C	+C	--	--	+C
F-4	--	--	+C	--	--	-2ND	--	-XND
F-5	--	+X	--	--	--	--	-XND	--
F-6	-XND	-XND	+XND	+XND	-XND	-XND	+2ND	-XND
F-7	--	--	--	--	--	-XND	-XND	--
F-8	-2ND	-XND	--	--	-XND	--	-XND	--
F-9	-C	--	--	--	--	--	-XND	+X
F-10	--	+X	--	--	--	+XND	-XND	+2ND
C-1	-XND	-XND	-XND	--	--	--	-XND	--
C-2	--	-2ND	+C	--	+2	-CND	--	-2ND
C-3	--	--	--	--	--	--	--	--
C-4	--	--	--	--	--	--	-XND	-XND
C-5	-2ND	-XND	-CND	--	--	--	-XND	--
C-6	+CND	+C	--	+CND	--	--	--	-C
C-7	--	--	-XND	-XND	--	--	--	-XND
C-8	--	--	--	--	--	--	--	-XND
C-9	+CND	--	--	+X	--	--	+X	--
C-10	--	--	--	--	--	+XND	+XND	+XND
M	--	+C	--	+2	+C	+X	-2ND	-2ND
G	+C	+C	+2	+2	+C	+X	-2ND	-2ND
SP	+XND	--	+2	+C	--	+X	-2ND	-2ND
R	+C	--	+C	+2	+C	+C	-2ND	-2ND
SI	+C	+X	+2	+C	+C	--	-XND	+C

Symbols Used

When only Experimental Trend is Significant:

+X Experimental trend toward, and control away from, expected direction.
-X Experimental trend away from, and control toward, expected direction.
+XND No Difference -- both trends away from desired direction; control non-sig.
-XND No Difference -- both trends away from desired direction; control non-sig.

When both Experimental and Control Trends are Significant:

+2 Experimental trend toward and control away from expected direction.
-2 Experimental trend away from and control toward expected direction.
+2ND No Difference -- both trends significant in expected direction.
-2ND No Difference -- both trends significant away from expected direction.

When only Control Trend is Significant:

+C Experimental non-sig. trend is desired direction with control away from it.
-C Experimental non-sig. trend away from desired direction with control toward expected direction.
+CND No Difference -- both trends in expected direction; experimental non-sig.
-CND No Difference -- both trends away from expected direction; experimental non-sig.

-- Neither group significant

Table 33: Summary of Favorable Versus Unfavorable Comparisons of Experimental Group Trends with Control Group Trends

	Grade-Level Groups	No. Favorable* Comparisons	No. Unfavorable Comparisons
Elementary	1	6	5
	2	7	5
	3	8	5
	4	10	2
	5	8	2
	6	7	4
Sec-ondary	7-9	4	13
	10-12	6	11
Totals	Elementary	46	23
	Secondary	10	24
	All	56	47

*Favorable comparison: one in which it can be considered that the Experimental group has moved in the expected direction of treatment benefit.

Closer examination of Table 32 indicates that the Elementary school teachers generally have favorable comparisons on the Interpersonal Process (M, G, SP, R, SI) and Indirect Behavior (F-1, F-2, F-3, F-4) variables. The picture for the Secondary Schools is not as favorable as that of the Elementary Schools but the Senior High School (grades 10-12) does better than the Junior High (grades 7-9).

Although the data exhibits negative movement for the experimental groups, these are usually accompanied by negative movement of the matching control group as well. There is no case in which the experimental group had a significant negative direction accompanied by a significant positive direction for the control group. There are two cases (indicated by "C" in Table 32) in which the experimental group had a non-significant negative movement paired with a significant positive movement of the control group.

DISCUSSION

The "-XND", "-2ND", "+C", and "-CND" symbols registered in Table 32 are reflective of a general tendency which was found in the data. This tendency was most marked in the significant trends for the control group data. (See Table 30).

That is, in general[21], the behavior trend for the control group was a movement across the year from September to May towards increased amounts of direct teacher behavior (F-5, F-6, F-7, C-1), increased amounts of Silence and Chaos (F-10, C-10), lower levels of student participation (F-8, F-9, C-5, C-6, C-7, and C-8), and less facilitative levels of interpersonal processes. This was not strictly a linear trend and, of course, it varied considerably among grade-levels and variables but, in general, it showed a decreasing function from September through December or January, a partial recovery in January or February, and a second downward trend through May. For some variables there was a second slight recovery in May, ending the downward trend with April. (See A and B of Figure 4).

Thus, for the experimental group to show positive movement, they had to over-come this general downward trend before positive movement could be evidenced. The symbol "+C" in Table 32 indicates cases in which a significant negative trend in the control group is paired with a non-significant positive trend

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[21] Exceptions are indicated by * in Table 30.

of the experimental group. These cases are interpreted as being instances in which the experimental group succeeded in breaking up the negative trend but not in making significant positive movement. The symbols "-ND", "-2", "-2ND" in Table 32 indicates those cases in which the experimental group reflected the general negative tendency of the data.

The general trerd across time for the experimental groups was not as consistent as for the control groups, which also substantiates the concept of the experimental treatment benefits being in a direction opposed to the direction of the normal processes evidenced across the school year. Of the 97 significant trends detected in the experimental data, 38 were in the direction of expected treatment benefits. For the control groups, only 7 of the 79 significant trends were in this direction.

While examining the behavior trends across time, anecdotal evidence was discovered indicating that the measures selected for the study do reflect classroom processes accurately. This was found in the data taken in the week immediately following two racial incidents (a rape and a stabbing) in one of the secondary schools. The data for that time period (Feb., 1972) supplied by the faculty of the school which was involved in the racial incidents exhibited a severe depression in the variables most directly related to facilitative interpersonal processes. Thus, the data for that month for that school showed (1) marked decreases (from the levels attained in both the month preceding and the month following) in amount of praise given, questions asked by pupils, and student ideas accepted, and (2) a sharp increase in criticism and justification of authority and the amount of silence or confusion in the classroom. Decreases were also registered in the levels of the teacher's Meaning, Genuineness, Respect for Students, Success Promotion, and in the degree of Student Involvement in classroom processes.

SUMMARY

In conclusion, the findings from this study were:

1. The data supplied anecdotal validation that the measures selected for the project do reflect classroom process accurately.

2. Significant trends across time were found in the Control group data.

3. These trends were consistent with the interpretation that there is a deterioration across the year from September till May in the levels of facilitative conditions offered students.

4. Significant trends across time were detected in the Experimental Group data.

5. These trends were not as consistent as the trends from the Control data but were compatible with the interpretation that the benefits of the treatment applied (training of teachers) were in directions opposed to the direction of the normal processes evidenced across the school year.

6. Of the 97 significant trends in the Experimental data, 38 were in the direction of expected treatment benefits.

The first implication of this study for the applied research studies was that time of year was a confounding factor for the study variables and must be taken into consideration in the interpretation of research results. Secondly, a comparison of (1) the variables in which positive movement was evidenced and (2) the content of the training sessions for the year indicates a correspondence between the skills in which instruction was explicit and the variables in which movement was exhibited. This comparison led to the hypothesis that for the attainment of desired treatment benefits in additional variables, specific skills development training programs for those behaviors should be applied. To test this hypothesis, the training modules for the second year would have to undergo revision.

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STUDY NUMBER 7

RELATIONSHIPS BETWEEN PRE-TEST STANDING ON CLASSROOM FUNCTIONING VARIABLES AND TEACHER CHARACTERISTICS OF RACE, SEX, AND YEARS OF TEACHING EXPERIENCE

PURPOSE OF STUDY

The study posed the question:

Are teacher characteristics of sex, race, and years of teaching experience significant contributors to differences among the means of Classroom Functioning variables as measured by Flanders' Interaction Analysis Categories, Cognitive Functioning Categories, and Process Scales?

DESIGN

Sample

The sample for this study consisted of all Year 01 experimental (Training Condition) teachers who submitted at least 4 tapes during the year, two of which were the May, 1971* and May, 1972 tapes. Total N was 121. The bottom lines of Table 34 and 35 display the N by Sex, Race, and Teaching Experience groups.

Data Collection

Data for the study consisted of the individual's pre-test (May, 1971) scores on 10 Flanders' Interaction Analysis Categories, 10 Cognitive Functioning Categories, and 5 Process Scales. The data was collected through the normal procedures for assessment of tape data described in Part I.

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*For the thirteen teachers who had not been employed by the school system in May, 1971, the September, 1971 tape was used as the pre-test tape.

ANALYSIS

Twenty-five analyses of variance were conducted, using in turn each of the Flanders', Cognitive, and Process scores as the dependent variable. Factors were teacher characteristics of sex, race, and years of teaching experience. The groups by characteristic and code number were as follows:

Sex

1 - Male
2 - Female

Race

1 - Black American
2 - White American

Years of Teaching Experience

1 - 1 Year
2 - 2 Years
3 - 3 to 7 Years
4 - 8 to 15 Years
5 - 16 to 24 Years
6 - Over 25 Years

The current school year was counted as 1 year since it would be completed by the time of the post-test. Thus, for number of years experience prior to the current year, subtract 1 from each of the figures above. That is, a "1 year" teacher is in her 1st year of teaching and has had 0 years of prior experience. A "2 years" teacher is in her second year of teaching and has had 1 year of prior experience, etc.

RESULTS

Table 34 presents the results of the 25 analyses. It lists by source of variance all significance levels less than .05 which were detected.

This level of significance was reached by one or more factors for 11 of the 25 variables. Interaction effects were significant for two variables. Tables 35 and 36 present the means of the significant factors for the variables affected.

Sex was the greatest contributor to variation, affecting 9 of the twenty-five variables. Of these 9 variables, 4 were teacher behavior variables (F-5, C-1, G, SP) and 5 were student behavior variables (F-8, F-9, C-5, C-6, C-8).

Table 34: Significance Levels Less Than .05 by Sources of Variation for 25 Analyses of Variance by Sex, Race, and Years of Teaching Experience for Classroom Functioning Variables

Variables*	Main Effects			Interaction Effects		
	SEX	RACE	YTEA	SxR	SxY	RxY
F-1	--	--	--	--	--	--
F-2	--	--	--	--	--	--
F-3	--	--	.0276	--	--	--
F-4	--	--	--	--	--	--
F-5	.0024	--	--	--	--	--
F-6	--	--	.0015	--	--	--
F-7	--	--	--	--	--	--
F-8	.0046	--	--	--	--	--
F-9	.0142	--	--	--	--	--
F-10	--	--	--	--	--	--
C-1	.0014	--	--	--	--	--
C-2	--	--	--	--	--	--
C-3	--	--	--	--	--	--
C-4	--	--	--	--	--	--
C-5	.0214	--	--	--	--	--
C-6	.0211	--	--	--	--	--
C-7	--	--	--	--	--	--
C-8	.0129	--	--	.0079	.0155	--
C-9	--	--	--	--	--	--
C-10	--	--	--	--	--	--
M	--	--	--	--	--	--
G	.0459	.037	--	--	--	.0477
SP	.0480	--	--	--	--	--
R	--	--	--	--	--	--
SI	--	--	--	--	--	--
DF	1, 106	1, 106	5, 106	1, 106	3, 106	3, 106

*See Table 8, Part I, for names of Variables.

+Results of Duncan's New Multiple Range Test.

Table 35: Means for Sex and Race Groups for Variables in which Significant Differences by Sex or Race were Detected

Dep. Var.	Means by Sex		Means by Race	
	Male	Female	Black American	White American
F-5	113.87	69.12	--	--
F-8	47.25	84.32	--	--
F-9	22.75	9.72	--	--
C-1	123.75	79.03	--	--
C-5	55.12	89.72	--	--
C-6	4.81	1.67	--	--
C-8	3.25	0.23	1.42	0.32
G	2.65	2.39	2.30	2.47
SP	2.73	2.45	--	--
N	16	105	33	88

Table 36: Means for Teaching Experience Groups for Variables in which Significant Differences by Years of Teaching Experience were Detected

Dep. Var.	Means of Teaching Experience Groups						Significant Comparisons*
	1 Yr.	2 Yrs.	3-7 Yrs.	8-15 Yrs.	16-24 Yrs.	Over 25 Yrs.	
F-3	5.50	2.81	0.69	1.74	3.56	1.55	3 < 1, 5 6 < 1
F-6	25.5	11.00	5.80	5.93	7.56	6.61	2-6 < 1
G	2.37	2.43	2.41	2.56	2.40	2.24	6 < 4
N	10	11	26	31	25	18	

*Results of Duncan's New Multiple Range Test.

Race did not appear to have an important effect on the study variables. It showed up only once in main effects (G) and twice in interactions (C-8, G).

Years of teaching experience was slightly more important than race. It showed up twice in main effects (F-3, F-6) and twice in interactions (C-8, G).

DISCUSSION

Sex contributed the most systematic information from the analyses. Male teachers in general lectured more than female teacners (F-5) but they also allowed or elicited more student initiated responses (F-9). These student initiated responses included students asking more fact and more thinking questions (C-6, C-8) of male teachers than of female teachers. Female teachers elicited more directed student response (F-8) and more student recall of facts (C-5) than did male teachers, and spent less time presenting facts (C-1) and slightly more time modeling thinking for students. However, there was no significant difference in the amounts of time male and female teachers spent in the C-3 (Teacher Thinks) category. (Mean for males was 0.15; for females, 0.17). Males were higher than females in both of the Process Scales in which sex reached .05 significance.

The above results must be considered in view of the fact that the sample included only 16 male teachers and 13 of these were secondary school teachers, whereas a majority of the female teachers were elementary teachers. Reference to Studies No. 3 and 4 (cf. ante) indicates that the pattern of differences due to grade-level (secondary vs. elementary) is the same for variables F-5, F-8, F-9, C-1, C-5, and C-6 as the pattern for male/female differences on those variables. That is, both males and secondary teachers are higher on variables F-5, F-9, C-1, C-6 and both males and secondary teachers are lower on variables F-8 and C-5. So it is not possible to make a clear-cut determination as to whether sex or grade-level or an interaction of these two factors is the primary source of differences on these variables. Since the sex/grade-level distributions for the sample in Studies 3 and 4 were 5 males to 123 females at the elementary level and 29 males to 81 females at the secondary level, it appears more probable that at least on the factors F-5, F-9, C-1, C-6, F-8, and C-5 grade level contributed to apparent sex differences and not the reverse.

However, for variables G and SP, grade level was not a significant factor in prior studies (See Table 19, Study No. 3) and for variable C-8 the elementary vs. secondary pattern did not hold; so for these three variables, sex can

be clearly considered a significant contributor to the variance. That is, male teachers functioned at higher levels of the two Process Scales (G, SP) and were asked significantly more thinking questions by their students (C-8).

The information from race was not systematic. White Americans had higher means in the variable (G) in which race was a significant main effect but had lower means in the variable (C-8) in which race showed as one of two significant interactions with sex.

Teaching experience also offered little systematic information but what there was seemed to indicate that teachers who were starting their first year were different from other teachers, at least on variables F-3 and F-6. They gave more directions to students and accepted more student ideas than did other teachers.

SUMMARY

In conclusion, findings from this study were:

1. Of the three factors, (sex, race, and years of teaching experience), sex contributed more to the variation of the classroom functioning variables than did either of the other two factors.

2. Sex contributions to the variation of G (Genuineness of the teacher), SP (Success Promotion), and C-8 (Student asks for Thinking) seemed to be clear-cut, with male teachers functioning at higher levels than female teachers.

3. Sex contributions to the variation of F-5, F-8, F-9, C-1, C-5, and C-6 may have been contaminated by grade-level differences. However, the significant differences detected for these variables in the present study indicated that male teachers lectured more (F-5), allowed or elicited more student initiated responses (F-9), were asked more fact questions (C-6) by their students while female teachers elicited more directed student response (F-8) and more recall of facts (C-8) by their students and spent less time presenting facts (C-1) to their students.

4. Race did not seem to have important effects on the study variables and the information provided by its one significant main effect and two significant interactions (with sex) were in opposite directions.

5. Teaching experience showed as a significant factor in four variables; as a main effect for variables F-3 and F-6 and in interactions for variables C-8 and G. The information provided by these analyses seemed to be that teachers beginning their first year of teaching were different from other teachers in that they gave more directions (F-6) and accepted more student ideas (F-3).

The implications of these findings for applied research were that studies of differential response to training should include correction of post-test scores for pre-test standing on at least sex and teaching experience characteristics.

STUDY NUMBER 8

CORRELATION OF CLASSROOM FUNCTIONING VARIABLES WITH TEACHER'S LEVEL OF PHYSICAL FUNCTIONING

PURPOSE OF STUDY

Because the results of Study No. 11 for years 01 and 02 indicated that there were unsystematic effects of sex and years of teaching experience on response to training, the researchers wondered if the teacher's level of physical functioning might be an underlying factor which was related to these results. Therefore, the following question was posed:

> Are there significant correlations between the teacher's level of physical functioning (as measured by the Harvard Step Test) and Classroom Functioning Variables as measured by Flanders' Interaction Analysis, Cognitive Functioning Categories, and Process Scales?

DESIGN

Sample

The sample for this study was the 46 Year 03 experimental teachers who (1) submitted a tape in September, 1973 and (2) completed the Harvard Step Test.

Data Collection

The Harvard Step-Test was administered by an NCHE trainer who visited the experimental schools for this purpose. The individual's scores on 10 Flanders' Interaction Analysis Categories, 10 Cognitive Functioning Categories, and 5 Process Scales was collected through the normal procedures for assessment of tape data described in Part I.

The Harvard Step-Test is reported as the total number of pulse beats in two minutes immediately subsequent to cessation of controlled exercise. (The higher the number, the poorer the physical condition). The mean for elementary teachers was 170.2; for secondary teachers, 177.3.

ANALYSIS

Pearson's Correlation Coefficients were calculated for each classroom functioning variable. The calculations were carried out separately for elementary and secondary school teachers.

RESULTS

Table 37 presents the correlation coefficients for both elementary and secondary teachers. Seven coefficients were high enough to be significant at $p < .05$. This is approximately three times as many significant correlations as would be expected by chance at the .05 level.

DISCUSSION

Since seven of the 50 coefficients reached acceptable levels of significance, the conclusion was that there is a non-chance relationship between the level of physical functioning and the Classroom Functioning of the teacher. This relationship seemed to be stronger for secondary than for elementary teachers.

The relationship also seemed to occur in different directions for the two sets of teachers. Comparing the signs of the correlation coefficients in Table 37 reveals that for 13 of the twenty-five variables, elementary and secondary teachers have signs in opposite directions. Four of these 13 variables were ones in which at least one of the coefficients was significant.

SUMMARY

This study indicated that there was a non-chance relationship between the teacher's level of physical functioning and Classroom Functioning variables. On this basis, the researchers decided to use the Harvard Step-Test Score as a second concomitant variable for the replication of Study No. 11 to be carried out in Year 03.

Table 37: Correlation Coefficient for Harvard Step-Test Score with Pre-Test Scores of 25 Classroom Functioning Variables for Elementary and Secondary Teachers

	Elementary		Secondary	
	r	p <	r	p <
F-1	0.0	--	0.0	--
F-2	-.04	--	.03	--
F-3	-.34	.05	.36	--
F-4	.06	--	.46	--
F-5	-.21	--	.69	.02
F-6	.18	--	-.29	--
F-7	.05	--	-.48	--
F-8	.12	--	.78	.01
F-9	.23	--	-.74	.01
F-10	-.09	--	-.57	--
C-1	-.03	--	.48	--
C-2	-.06	--	.44	--
C-3	0.0	--	0.0	--
C-4	.07	--	.05	--
C-5	.08	--	-.13	--
C-6	.35	.05	-.80	.01
C-7	.13	--	-.01	--
C-8	.08	--	0.0	--
C-9	.09	--	.80	.01
C-10	-.10	--	-.46	--
M	.003	--	.10	--
G	.02	--	.34	--
SP	.05	--	.05	--
R	.02	--	.36	--
SI	.11	--	.26	--
	N=34		N=12	

STUDY NUMBER 9

RESPONSE SURFACE ANALYSIS*

PURPOSE OF STUDY

This study posed four questions:

1. Can replicable, predictable, and significant relationships be detected among Classroom Functioning Variables as measured by Flanders' Interaction Analysis categories, Cognitive Functioning Categories, and Process Scales?

2. Will these relationships be different at the elementary and secondary levels?

3. Can specific recurring predictors be identified for each of the Classroom Functioning Variables?

4. Can response surfaces generated from the regression equations resulting from backward elimination multilinear regression analysis provide information that will be useful in guiding the design of training programs?

DESIGN

Sample

The sample for this study was all Year 01, Year 02, and Year 03 teachers who submitted 5 or more tapes during the year. Table 38 presents the data base for the study.

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*This study is only summarized here as it was presented in detail in F. N. Roebuck and D. N. Aspy, Response Surface Analysis: Interim Report No. 3. Monroe, LA: National Consortium for Humanizing Education, Northeast Louisiana University (National Institute of Mental Health Research Grant No. 5 P0 1 MH 19871), 1974. Separate presentation of this study was necessary because it involved 86 pages of illustrations of response surfaces generated from the analyses.

Table 38: Data Base for Response Surface Analysis

	Elementary			Secondary		
	Yr. 01	Yr. 02	Yr. 03	Yr. 01	Yr. 02	Yr. 03
No. of Teachers	162	132	55	98	60	44
No. of Hours of Instruction Coded	1,194	974	322	607	376	225

Data Collection

Study variables were the individual's scores on 10 Flanders' Interaction Analysis Categories, 10 Cognitive Functioning Categories, and 5 Process Scales. The data was collected through the normal procedures for assessment of tape data described in Part I.

ANALYSIS

Response Surface Analysis was carried out for each of the 25 study variables. The procedure used was to designate each of the study variables in turn as the dependent variable with the remaining 24 variables being considered as independent. The computer was then loaded with the linear, quadratic, and cross-product values of the independent variables and backward elimination multilinear regression analysis was carried out. The procedure was continued until only two variables were left in the model. The resulting regression equation was used to generate points with which to plot the response surface. The regression equation with 3 variables was also identified and a 3-variable response surface was generated for each study variable.

The analysis for each study variable was carried out separately for elementary (grade 1-6) and secondary (grade 7-12) teachers as it was anticipated that the relationships would be different at the two levels. Since there were three samples (Year 01, Year 02, and Year 03) at each level which were analyzed separately, a total of 150 analyses were conducted. Each analysis yielded two response surfaces -- a 2-variable surface and a 3-variable surface--for a total of 300 surfaces which were constructed.

RESULTS

From Regression Analysis

A majority of the regressions were significant at $p < .001$; however, they ranged as high as $p < .75$. Acceptable levels of significance were $p < .05$. Only 19 of the 150 regressions failed to achieve this level of significance. Variable F-7 at the Secondary Level was the only variable which was consistently insignificant; it failed to reach the .05 level in all three samples.

Achieved R^2 for the three-variable equations ranged from .01 to .99. Some variables were predictable at approximately the same levels of R^2 from sample to sample (within a school

level) while other variables showed wide differences in achieved R^2 among samples. A methodical comparison of the R^2's provided an estimate of the stability of predictability of the study variables from sample to sample. Table 39 summarizes the results of this comparison.

Some study variables consistently predicted the same dependent variables from sample to sample within a school level. These predictors were designated "Recurring Variables." Table 40 presents the Recurring Variables for each dependent variable at each school level.

It is obvious from scanning Table 40 that some variables featured more frequently as predictors of the other study variables. The relative frequency of each of the study variables as a predictor is summarized in Table 41.

From Construction of Response Surfaces

The 300 response surfaces generated from the 150 2-variable and the 150 3-variable regression equations derived from the three samples at each of two school levels were examined for information as to the dynamic relationships among the variables. Each surface presented its own exhibit of the dynamics of the inter-relationships of the study variables; however, two general observations could be made of the surfaces as a set.

First, many of the variables were related to the dependent variable in a curvilinear rather than a linear fashion. All but 11 of the 150 2-variable regression equations contained at least one quadratic or cross-product term, while 146 of the 3-variable equations contained such a term.

Second, the surfaces emphasized the dynamic quality of the inter-relationships of the predictor variables. In several cases, the directionality of the relation between the dependent variable and a predictor variable was completely reversed as the value of a second predictor variable changed.

DISCUSSION

One of the major reasons for conducting this extensive examination of the relationships between Classroom Functioning variables was the need of the researchers to be able to specify the expected direction of treatment benefit for each of the 25 study variables. The National Consortium for Humanizing Education had hypothesized that a humane classroom was characterized by four types of behavior:

Table 39: Stability of Predictability of Study Variables from Sample to Sample within School Levels

			Elementary Level	Secondary Level
Stable	With Consistently +Ample R^2		F-5 C-2 C-4 C-7 C-10 M G SP R SI	F-5 F-10 C-2 C-10 M R SI
	With Consistently Low R^2		F-2	F-7* F-8*
Not Characterized as to Stability		Ample R^2	F-4 F-10	F-3 C-4 C-5* C-9* SP
		Low R^2	F-6 F-8* F-9 C-1*	F-6* F-9 C-8*
Unstable	With Inconsistently Ample R^2		C-9	F-4 C-7 G
	With Inconsistently Low R^2		F-1* F-3* F-7 C-3* C-5* C-6 C-8*	F-1* F-2* C-1* C-3* C-6

*Indicates that at least one of the 3 regressions within the school level for the variable did not reach $p < .05$.

+Ample R^2 was defined as $R^2 > .35$ in at least two of the three samples.

Table 40: Recurring* Predictive Variables

Dependent Variable	Elementary Teachers: Variables Recurring as Predictive of Dependent Variable in Equations for 2 Samples	Elementary Teachers: Variables Recurring as Predictive of Dependent Variable in Equations for 3 Samples	Secondary Teachers: Variables Recurring as Predictive of Dependent Variable in Equations for 2 Samples	Secondary Teachers: Variables Recurring as Predictive of Dependent Variable in Equations for 3 Samples
F-1	M, C-7	F-9	M, SI	C-7
F-2	SI	C-2, M	C-7, C-5	SI
F-3		C-7, SI	C-4, SI	C-2
F-4	R, C-5, C-7	C-6	SP, R, C-7	C-5
F-5	R, C-3	C-5	C-5, R	M
F-6	M, C-1, C-2, SI		SI	F-10, C-1
F-7		C-1, M, C-2		C-1, M
F-8	C-2	F-7, R	R, C-2	F-2
F-9	C-2	M	C-2, SP, F-2, F-1	
F-10	SI, C-2	C-1	C-2, SI	C-1
C-1	M, R, C-6	C-8	C-6	R, M
C-2	M	F-4, C-7		F-4, R, C-7
C-3	F-2	F-5, C-8	F-5, C-8	G
C-4		C-7, F-4, M	F-3, F-4, M	C-7
C-5	F-4, F-7	R	R, F-4	F-7
C-6	F-4, F-8, SI		F-3, SI, F-8	
C-7	F-8, SP	C-4		C-4, F-1
C-8	M, SI, C-3, C-4		C-3, M, F-1, SI	
C-9	F-1	F-7, M	F-3, F-7, C-7	M
C-10	C-4, F-5	SI	F-6	F-5, SI
M		R, F-2	C-1, C-7	R
G	F-7, M	F-2	F-7, F-2, M	C-1
SP	F-2, C-4, M, C-1		M, C-1, F-2	
R	C-7, F-3	G	F-1, C-7	G
SI	F-1, C-7	G		G, C-7

*Recurring from sample to sample as predictor for same dependent variable.

Table 41: Summary of Predictive Appearances of Recurring Variables

	Predictive Variables	No. of Appearances		
		Total	Elementary Data	Secondary Data
M:	Meaning	53	29	24
C-7:	Student Thinks	39	17	22
SI:	Student Involvement	34	16	18
R:	Respect	32	15	17
C-1:	Teacher Recalls Facts	25	10	15
C-2:	Teacher Asks for Facts	23	14	9
F-2:	Teacher Praises	19	10	9
F-4:	Teacher Asks Questions	17	10	7
F-7:	Teacher Criticizes	17	10	7
G:	Genuineness	15	6	9
C-4:	Teacher Asks for Thinking	14	9	5
F-1:	Teacher Accepts Feelings	13	4	9
C-5:	Student Recalls Facts	12	5	7
F-5:	Teacher Lectures	10	5	5
F-3:	Teacher Accepts Ideas	8	2	6
C-8:	Student Asks for Thinking	8	6	2
C-3:	Teacher Thinks	7	5	2
C-6:	Student Asks for Facts	7	5	2
F-8:	Student Responds	6	4	2
SP:	Success Promotion	6	2	4
F-9:	Student Initiates	3	3	*
F-10:	Silence or Confusion	3	*	3
F-6:	Teacher Gives Directions	2	*	2
C-9:	Non-Cognitive Behavior	*	*	*
C-10:	Silence and Confusion	*	*	*

*Variable occurred only at random in this data; i.e., it did not recur from sample to sample within a level as predictor for the same dependent variable.

1. Frequent acceptance of student feelings,

2. High amounts of student participation,

3. High levels of student thinking beyond the use of facts, and

4. High degrees of student involvement.

From this hypothesis, the expected direction of treatment benefits was self-evident for variables F-1, F-8, F-9, C-7, and the Process Scales. And from the implications of directionality of these variables, expected direction could be derived for variables F-2, F-3, F-4, C-2, and C-4. However, the implications for F-5, F-6, F-10, C-1, C-3, C-5, C-6, C-9 and C-10 were not so clear. By examining the response surfaces generated in this study, it was possible to specify the expected direction of treatment benefit for all variables.

Examination of the individual response surfaces also provided guidance for focusing training to change specific aspects of teacher or student behavior. For example, examination of the response surfaces for F-9 (Figures 6 & 7) suggested that in order to increase the amount of Student Initiation at the elementary school level, training should focus on helping the teacher to understand the meaning-to-the-student of his classroom experiences and to communicate acceptance of the student's feelings. At the high school level, training to increase Student Initiation should focus on helping the teacher (1) to raise his levels of skill in promoting the student's achievement of individual goals and (2) reduce the amount of time he spends asking students to recall facts. (See Figures 6 and 7).

SUMMARY

In conclusion, the findings from this study are:

1. Replicable, predictable, and significant relationships were detected among variables of teacher and student classroom functioning.

2. These relationships were different at the secondary and elementary school levels.

3. Specific recurring predictors for each of the study variables were identified.

4. Some of the classroom functioning variables co-varied significantly and frequently with a large number of the other study variables, and these

predictors were few enough in number to suggest that efficient programs for changing overall classroom functioning could be developed by focusing training efforts on these few highly predictive variables.

5. The individual response surfaces generated for each study variable provide specific suggestions for focusing training efforts aimed at changing selected aspects of teacher or student behavior.

6. Two of the 4 most frequently recurring predictors (and 3 of the top 10) were variables which had been postulated by Rogers as being positively related to effective learning environments.

7. Most of the frequently recurring predictors were related to the kinds of behavior classified by Flanders' as "Indirect."

8. The kinds of behavior hypothesized by the National Consortium for Humanizing Education as characterizing a humane classroom were also the kinds of behavior which were frequently recurring predictors of the other study variables.

9. The curvilinear relationships detected were strong enough and constant enough to suggest that educational researchers need to emphasize the building and testing of at least quadratic models.

The most important implication of this study for the NCHE applied studies was the specification of the expected direction of treatment benefits for each of the 25 classroom functioning variables. However, the other findings from this study have important implications for applied research in education in general. Also, the methodology (Response Surface Analysis) seems a promising one for researchers in education and other social sciences.

Figure 6: Response Surface for
F-9: STUDENT INITIATES at the Elementary School Level

$F\text{-}9 = 6.59066 - 47.9076F1F1 + 15.013F1M$

$R^2 = 0.172$ $s_E = 5.945$ $\underline{F} = 16.559$

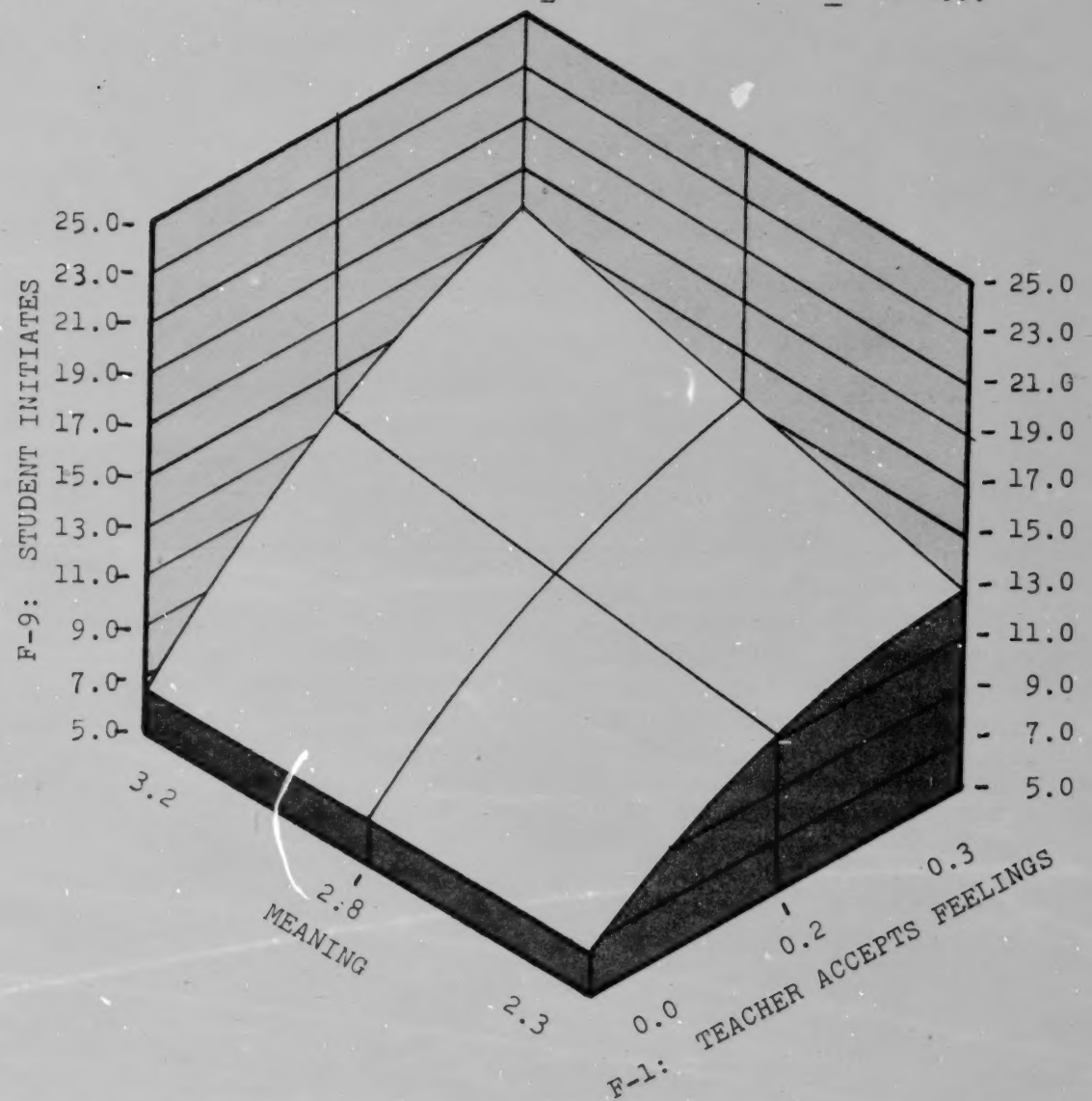
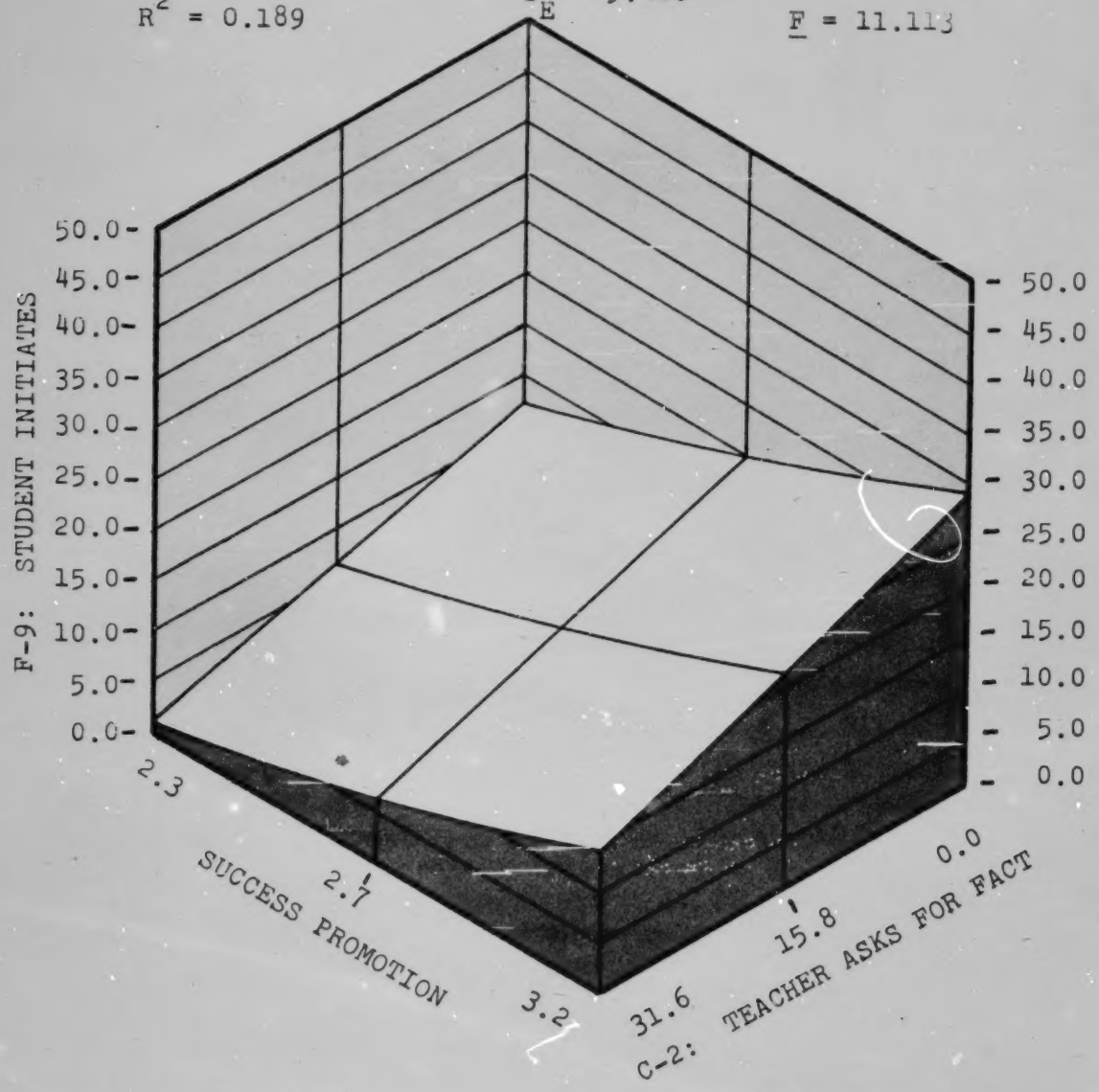


Figure 7: Response Surface for
F-9: STUDENT INITIATES at the Secondary School Level

$F\text{-}9 = -5.07259 - 0.153C2SP + 0.334SPSP$

$R^2 = 0.189$ $\quad s_E = 9.408$ $\quad \underline{F} = 11.113$



PART III

Presentation of

Applied Research Studies

STUDY NUMBER 10

ANALYSIS OF CO-VARIANCE FOR DIFFERENCES BETWEEN TREATMENT POST-TEST MEANS OF THE CLASSROOM FUNCTIONING VARIABLES

PURPOSE OF STUDY

This study posed two questions:

1. When adjusted for pre-test standing, is there a significant difference between the treatment (Training vs. No Training Condition) post-test means on the Classroom Functioning variables as measured by Flanders' Interaction Analysis Categories, Cognitive Functioning Categories, and Process Scales?

2. Are the differences cumulative across two years treatment?

DESIGN

Sample

This study utilized three samples consisting respectively of all Year 01, 02, and 03 teachers who met the inclusion criteria for their samples. Criteria for each sample were:

1. Year 01 sample included all teachers who (a) had submitted four or more tapes, two of which were the May, 1971 and May, 1972 tapes and (b) if in experimental group, had completed the training program.

2. Year 02 sample included all teachers who (a) had submitted four or more tapes during the second year, one of which was the May, 1973 tape, (b) had previously submitted the May, 1971 and May, 1972 tapes, and (c) if in experimental group, had completed the training program.

3. Year 03 sample included all teachers who (a) had submitted four or more tapes, two of which were the September, 1973 and the April, 1974 tapes and (b) if in experimental group, had completed the training program.

Table 42 displays the N by grade-level and treatment groups for each sample. Total N for three years was 482; however, the Year 02 N (155) was contained within the Year 01 N. (See above).

Data Collection

Data for this study was the individual's scores on each of the pre and post-test (as specified above for each sample) audio tape recordings of classroom instruction on each of the 10 Flanders' Interaction Analysis Categories, 10 Cognitive Functioning Categories, and 5 Process Scales. The data was collected by the regular procedures for assessment of tape data described in Part I. For names of variables, see Table 8 in Part I.

ANALYSIS

The procedure used in the analysis was a two-way analysis of co-variance with pre-test score as the concomitant variable. Factors were grade-level at which the teacher instructs and treatment condition. Grade level was included as a factor on the basis of Studies No. 3 and 4. (cf. ante).

There were two treatment conditions: Training[22] and No-Training. These are referred to respectively as Experimental and Control groups. In Year 02 only, both groups were sub-divided by rotating one control school into the experimental (Training) condition and by rotating one experimental school into the No-Training (Control) condition. These groups are referred to respectively as 1C2X and 1X2C while the groups which remained in the same condition for a second year are referred to as 2YrX (Training) and 2YrC (No-Training).

Grade level groups for the three samples are as follows:

Years 01 and 02	Year 03
Grade 1	Grades 1-3
Grade 2	Grades 4-6
Grade 3	Grades 7-8
Grade 4	Grades 9-12

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[22] In-Service Training for teachers. For details of training, see Aspy, et al., Interpersonal Skills Training for Teachers: Interim Report #2. Monroe, LA: (National Institute of Mental Health Research Grant No. 5 P01 MH 19871), 1974.

Table 42: Distribution of Teachers by Grade Level and Treatment Condition for Three Samples

Samples	Grade Levels	Treatment Conditions				Total Sample
		Training		No Training		
		Experi.	1C2X	1X2C	Control	
Year 01	Elementary (1-6)	55	--	--	66	121
	Special Teachers*	14	--	--	13	27
	Secondary (7-12)	52	--	--	40	92
	Total	121	--	--	119	240
Year 02	Elementary (1-6)	25	8	20	39	92
	Special Teachers*	7	0	2	5	14
	Secondary (7-12)	20	0	3	26	49
	Total	52	8	25	70	155
Year 03	Elementary (1-8)	46	--	--	23	79
	Secondary (9-12)+	10	--	--	8	18
	Total	56	--	--	31	87

+ This change in the grade levels included in Secondary Schools was occasioned by organizational pattern of schools in the replication site.

*These are non-classroom teachers in grades 1-6 who provide special services (such as speech therapy) or special subject matter (such as art) for students from more than one grade level.

Years 01 and 02 (Cont'd)

Grade 5
Grade 6
Special Teachers-Service (1-6)*
Special Teachers-Subject (1-6)*
Junior High (7-9)
Senior High (10-12)

"Special Teachers" included those non-classroom teachers in grades 1-6 who provide special services (eg., speech therapy) or special subject matter (eg., art) for students from more than one grade level. The grade level groups were collapsed for Year 03 because of small N and because no grade-by-treatment interaction effects within the limits of the collapsed groups had been detected in Years 01 or 02.

The data for each year was analyzed separately to determine the treatment effects for that year. In order to test for cumulative differences across two years, the Year 02 post-test (May, 1973) data for groups 2YrC and 2YrX was re-run, using the pre-test data from Year 01 (May, 1971) as the concomitant variable.

Prior to conducting the analyses, the results of Study 9 (cf. ante.) were used to specify the expected direction of treatment (training) benefit for each of the 25 classroom functioning variables. It was determined that treatment benefits should result in increases in F-1, F-2, F-3, F-4, F-8, F-9, C-2, C-3, C-4, C-5, C-6, C-7, C-8, C-9, M, G, SP, R, and SI while decreases should be registered in F-5, F-6, F-7, F-10, C-1, and C-10. The asterisks in Tables 43-49 indicate the direction of treatment benefit for each variable.

RESULTS

From Year 01 Data

Twenty-five analyses of co-variance were conducted using in turn each of the Flanders', Cognitive, and Process scores as the dependent variable. Table 43 displays the results of the analyses. It lists by sources of variation all significance levels less than .10 which were detected.

As indicated by the asterisks in Table 43, the experimental group mean was closest to the anticipated direction of treatment benefit for 14 out of the twenty-five variables; and

*These two groups were collapsed into one group for Year 02.

Table 43: Significance Levels Less Than .10 by Source of Variation for 25 Analyses of Co-Variance of Grade-Level and Treatment Means of Classroom Functioning Variables for Year 01 Teachers in Grades 1-12

Dep. Var.	Min. Sig. Prob. by Source of Variation			Adj. Post-Test $\bar{X}$		Sig. Grade Comparisons+
	Grade	Treatment	G x T	Experi.	Control	
F-1	--	--	--	0.01	0.08*	--
F-2	.0007	.0001	.0072	4.59*	1.33	1-6, 10-12<7-9
F-3	.0749	.0001	.0433	1.63*	0.29	10-12 < 1-9
F-4	.0001	.0014	--	17.69	23.00*	7-12 < 2&6
F-5	--	--	--	85.57*	93.00	--
F-6	.0005	--	--	10.00	9.02*	2-12 < 1
F-7	.0097	--	.0613	1.44*	1.64	2-12 < 1
F-8	--	--	--	58.10	66.24*	--
F-9	--	--	--	10.23	10.58*	--
F-10	--	.0010	--	50.00	34.48*	--
C-1	--	--	--	104.61*	104.97	--
C-2	.0001	.0078	--	20.09*	15.92	7-12 < 1,4, & 6
C-3	--	--	--	0.23*	0.13	--
C-4	--	.0116	--	0.67	2.22*	--
C-5	--	--	--	65.86*	64.57	--
C-6	--	--	--	1.75	2.34*	--
C-7	--	.0085	--	1.43	5.56*	--
C-8	--	--	--	0.03	0.06*	--
C-9	--	--	--	3.52*	3.22	--
C-10	--	.0159	--	47.09	35.71*	--
M	--	.0001	.0589	2.63*	2.46	--
G	--	.0008	.0142	2.60*	2.45	--
SP	--	.0144	.0519	2.57*	2.46	--
R	--	.0001	.0135	2.63*	2.48	--
SI	--	.0036	--	2.73*	2.61	--
	DF = 9, 219	DF = 1, 219	DF = 9, 219	N = 121	N = 119	

+Results of Duncan's New Multiple Range Test.
*Mean Associated with direction of expected treatment benefits

this was a significant difference (at the .05 level) for eight variables (F-2, F-3, C-2, M, G, SP, R, SI). Five other variables (F-4, F-10, C-4, C-7, and C-10) reached the level of significance specified, but in these variables, the control group mean was the farthest in the direction of treatment benefit.

From Year 02 Data

Two series of Analysis of Co-variance were planned using the Year 02 post-test (May, 1973) data. One series (referred to as Year 02 series) would use the data from all four treatment groups with the May, 1972 pre-test as covariate. To test for cumulative differences across both years, the second series (called, obviously, Cumulative Differences series) would use only the data for the teachers in groups 2YrC and 2YrX with the May, 1971 pre-test as co-variate.

Because the five significant main effects of grade-level and the seven significant grade-by-treatment interactions in the Year 01 data seemed to suggest that differences between secondary and elementary schools might be masking treatment differences* and because there were no Secondary teachers in the 1C2X group and only 3 in the 1X2C group, it was decided that the analysis for both the Year 02 series and the Cumulative Differences series should be run a second time using only data from grades 1-6.

This meant a total of 100 analyses of co-variance in 4 runs of 25 analyses each. The series are presented separately below.

Year 02 Series: Tables 44 and 45 present the results of the two runs for the Year 02 series. Summarizing data for grades 1-12, Table 44 reveals significant differences among the treatment means for only two variables (C-9 and SI). However, for every variable, the asterisk indicating the mean which is farthest in direction of treatment benefit is on an experimental mean -- 13 on the means of the 2YrX groups and 12 on the means of the 1C2X group.

Removal of the effect of the Secondary School data changes the picture. Table 45 displays the results of the analysis of Year 02 data, using only grade levels 1-6.

The first thing of interest in Table 45 is the inflation (in positive directions) of the means of the 2YrX group with

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*This hypothesis had been tested with a posteriori analysis in the Year 01 data and had been supported.

Table 44: Significance Levels Less Than .10 by Source of Variation for 25 Analyses of Co-Variance of Grade-Level and Treatment Means on Classroom Functioning Variables for Year 02 Teachers in Grades 1-12

Dep. Var.	Min. Sig. Prob. by Source of Variation			Adjusted Treatment Means				Sig. Grade Comparisons+
	Grade	Treatment	G x T	2YrX	1C2X	1X2C	2YrC	
F-1	--	--	.0004	0.77*	0.25	0.03	0.04	--
F-2	.0010	.0982	--	2.44*	1.82	1.47	0.91	10-12< 1
F-3	--	--	--	1.33*	0.09	0.09	0.01	--
F-4	.0763	--	--	18.01	19.02*	14.31	16.63	--
F-5	.0742	--	--	70.36*	79.01	78.10	84.63	--
F-6	--	--	.0803	4.72*	7.75	7.51	6.08	--
F-7	--	--	--	1.51	0.40*	1.36	0.77	--
F-8	.0154	--	--	65.28	103.77*	54.27	72.21	7-9< 2
F-9	--	--	--	15.25*	12.92	13.93	13.63	
F-10	--	.0516	--	24.30	18.22*	21.73	36.68	--
C-1	--	--	--	77.86*	78.36	80.37	93.76	--
C-2	.0155	--	.0557	15.48	21.93*	15.67	15.59	7-9< 1,2,&4
C-3	--	--	--	0.27*	0.00	0.00	0.04	--
C-4	.0272	--	--	1.64*	0.18	0.22	0.93	3< 5
C-5	.0051	--	--	71.35	117.64*	67.62	84.18	7-12< 1-3
C-6	.0289	--	--	1.62*	0.51	0.68	1.46	1< 6
C-7	--	--	--	3.04*	0.13	0.17	1.74	--
C-8	--	--	--	0.06*	0.00	0.00	0.04	--
C-9	.0429	.0490	--	3.84*	2.79	3.50	1.69	10-12< 1,1,&5
C-10	--	--	--	28.16	20.59*	24.66	33.91	--
M	.0289	--	--	2.34	2.63*	2.14	2.52	7-9< 1-6,10-12
G	.0389	--	--	2.32	2.58*	2.15	2.51	7-9< 1-6
SP	.0448	--	--	2.35	2.58*	2.18	2.52	7-9< 1-6
R	.0278	--	--	2.41	2.66*	2.16	2.51	7-9< 1-6
SI	.0026	.0481	--	2.52	2.90*	2.33	2.75	7-9< 1-6,10-12
	DF = 8, 122	DF = 3, 122	DF = 20, 122	N = 52	N = 8	N = 25	N = 70	

+Results of Duncan's New Multiple Range Test.
*Mean associated with direction of expected treatment benefits.

Table 45: Significance Levels Less Than .10 by Source of Variation for 25 Analyses of Co-Variance of Grade-Level and Treatment Means on Classroom Functioning Variables for Year 02 Teachers in Grades 1-6

Dep. Var.	Min. Sig. Prob. By Source of Variation			Adjusted Treatment Means				Sig. Grade Comparisons+
	Grade	Treatment	G x T	2YrX	1C2X	1X2C	2YrC	
F-1	--	--	.0006	.13*	.25	0.05	0.02	--
F-2	.0630	.0562	--	3.53*	1.87	1.40	1.33	--
F-3	--	--	--	2.16*	0.06	0.09	.01	--
F-4	--	--	--	23.93*	19.22	16.07	17.68	--
F-5	.0414	--	--	65.59*	79.01	82.40	70.70	3 < 4
F-6	--	--	--	6.07*	6.21	7.92	10.68	--
F-7	--	--	--	2.25	0.47*	1.57	0.99	--
F-8	--	--	--	86.24	104.19*	60.10	85.77	--
F-9	--	.0790	--	18.18*	12.99	15.39	9.70	--
F-10	--	.0423	--	17.59*	18.38	23.85	32.69	--
C-1	.0707	--	--	75.88*	78.75	83.70	83.37	--
C-2	.0703	--	.0625	20.66	22.02*	17.65	15.99	--
C-3	--	--	--	0.44*	0.0	0.0	0.0	--
C-4	.0663	--	--	2.13*	0.20	0.17	1.13	--
C-5	--	--	--	92.94	117.99*	75.07	95.08	--
C-6	.0092	--	--	1.31*	0.50	0.68	0.84	--
C-7	--	.0450	--	3.38*	0.14	0.20	0.88	--
C-8	--	--	--	0.09*	0.0	0.0	0.02	--
C-9	--	.0358	--	5.59*	2.87	3.82	2.08	--
C-10	--	--	--	23.23	20.77*	27.56	30.26	--
M	--	--	--	2.64*	2.63	2.31	2.45	--
G	--	--	--	2.62*	2.58	2.52	2.44	--
SP	--	--	--	2.64*	2.59	2.36	2.47	--
R	--	--	--	2.60	2.66*	2.33	2.44	--
SI	--	--	--	2.75	2.90*	2.55	2.71	--
	DF = 6, 77	DF = 3, 77	DF = 18, 77	N = 32	N = 8	N = 22	N = 44	

+Results of Duncan's New Multiple Range Test.
*Mean associated with direction of expected treatment benefits.

the removal of the influence of the Secondary School Data. Thus, the 2YrX group means now register 18 of the "benefit" asterisks with the 1C2X group accounting for the remaining seven variables.

Significant ($p < .05$) differences were detected among the treatment means for three variables (F-10, C-7, C-9) and two other variables (F-2, F-9) approach this level. All five variables are ones in which the two year continuous experimental group (2YrX) achieved the mean associated with treatment benefits.

Cumulative Differences Series: Tables 46 and 47 display the results of the analyses of co-variance of the Year 02 Post-Test means for groups 2YrX and 2YrC using the May, 1971 pre-test as co-variate. The analyses using the data from all grade levels is in Table 46 while Table 47 displays the results from grades 1-6.

As indicated in Table 46, significant differences among the treatment means were detected on variables F-2, F-10, and C-9. In each case, the mean associated with treatment benefits is that of the experimental group.

Table 47 indicates that (for grades 1-6) seven variables registered significant differences between the treatment means. In addition to F-2, F-10, and C-9, there are significant differences on F-4, F-9, C-7, and M. An eighth variable (C-8) approaches significance. In all 8 variables, the mean associated with treatment benefits is the experimental group mean.

From Year 03 Data

For the Year 03 study, the project was replicated in a different site, moving from an urban north central Texas school system to a rural northeast Louisiana system. Two series of Analysis of Co-variance were conducted using the September, 1973 and May, 1974 data for grades 1-12 and 1-8, respectively. Grades 7-8 were included in the elementary school data because of the way in which the schools were organized -- the seventh and eighth grades were included in either elementary schools or in middle schools (grades 4-8). The results of the analyses are displayed in Table 48 (for grades 1-12) and in Table 49 (for grades 1-6).

In Table 48, significant differences between the group means were detected for two variables (F-2 and F-7) and differences approaching significance were registered for four other variables (F-4, C-3, M, and G). Of these six variables, the mean associated with treatment benefits was the experimental mean in 4 cases (F-2, F-4, M, and G).

Table 46: Significance Levels Less Than .10 by Source of Variation for 25 Analyses of Co-Variance of Grade-Level and Treatment Means of Classroom Functioning Variables for Two-Year Teachers (Cumulative Differences) in Grades 1-12

Dep. Var.	Min. Sig. Prob. by Source of Variation			Adj. Treatment $\bar{X}$		Sig. Grade Comparisons+
	Grade	Treatment	G x T	2YrX	2YrC	
F-1	--	--	--	.09*	.04	--
F-2	.0001	.0019	--	2.51*	.90	10-12< 1-9
F-3	--	--	.0138	1.47*	.01	--
F-4	.0477	--	--	19.38*	16.63	10-12< 1-9
F-5	--	--	--	71.54*	84.59	--
F-6	.0565	--	.0941	4.97*	7.74	--
F-7	--	--	--	1.59	.77*	--
F-8	.0084	--	--	67.76	72.16*	10-12< 1,2,3,6
F-9	--	--	--	16.36*	13.62	--
F-10	--	.0412	--	23.72*	36.66	--
C-1	--	--	--	79.11*	93.67	--
C-2	.0076	--	.0498	16.68*	15.58	10-12< 4
C-3	--	--	.0221	.30*	.04	--
C-4	--	--	--	1.57*	.93	--
C-5	.0363	--	--	75.40	84.12*	10-12< 2,3
C-6	.0228	--	--	1.74*	1.45	1-5, 7-9 < 6,10-12
C-7	--	--	--	2.38*	1.74	--
C-8	--	--	--	0.06*	0.04	--
C-9	.0236	.0118	--	3.97*	1.68	6, 10-12 < 1-5
C-10	--	--	--	28.17*	33.87	--
M	--	--	.0283	2.42	2.52*	--
G	--	--	.0339	2.40	2.51*	--
SP	--	--	.0661	2.42	2.52*	--
R	--	--	.0597	2.39	2.50*	--
SI	--	.0881	.0788	2.50	2.74*	--
	DF = 7,100	DF = 1, 100	DF = 7, 100	N = 47	N = 70	

+Results of Duncan's New Multiple Range Test.

*Mean associated with direction of expected treatment benefits.

Table 47: Significance Levels Less Than .10 by Source of Variation for 25 Analysis of Co-Variance of Grade-Level and Treatment Means on Classroom Functioning Variables for Two-Year Teachers (Cumulative Differences) in Grades 1-6

	Min. Sig. Prob. by Source of Variation			Adj. Post Test $\bar{X}$		Sig. Grade Comparisons
	Grade	Treatment	G x T	2YrX	2YrC	
F-1	--	--	--	.13*	.03	--
F-2	.0101	.0042	--	3.53*	1.32	4 < 1
F-3	--	--	.0956	2.16*	0.01	--
F-4	--	.0451	--	23.88*	17.67	--
F-5	--	--	--	65.35*	70.56	--
F-6	--	--	--	6.03*	10.66	--
F-7	--	--	--	2.25	0.98*	--
F-8	--	--	--	86.04*	85.56	--
F-9	--	.0302	--	18.13*	9.68	--
F-10	--	.0126	--	17.54*	32.64	--
C-1	--	--	--	75.57*	83.13	--
C-2	.0088	--	.0779	20.63*	15.98	4 < 1-3, 5-6
C-3	--	--	--	.01	0.43*	--
C-4	--	--	--	2.13*	1.14	--
C-5	--	--	--	92.78	94.87*	--
C-6	.0021	--	--	1.31*	0.84	6 < 1-5
C-7	--	.0483	--	3.38*	0.88	--
C-8	--	.0819	--	.09*	0.03	--
C-9	--	.0102	--	5.59*	2.07	--
C-10	--	--	--	23.14*	30.19	--
M	--	.0498	--	2.64*	2.43	--
G	--	--	--	2.62*	2.43	--
SP	--	--	--	2.64*	2.46	--
R	--	--	--	2.60*	2.43	--
SI	--	--	--	2.75*	2.70	--
	DF = 6, 61	DF = 1, 61	DF - 6, 61	N = 32	N = 44	

+Results of Duncan's New Multiple Range Test.

*Mean associated with expected direction of treatment benefits.

Table 48: Significance Levels Less Than .10 by Source of Variation for 25 Analyses of Co-Variance of Grade-Level and Treatment Means on Classroom Functioning Variables for Year 03 Teachers in Grades 1-12

	Min. Sig. Prob. By Source of Variation			Adj. Post-Test $\bar{X}$		Sig. Grade
	Grade	Treatment	G x T	Experi.	Control	Comparisons+
F-1	--	--	--	0.04*	0.00	--
F-2	--	.0129	--	2.02*	0.30	--
F-3	--	--	--	0.09*	0.03	--
F-4	--	.0950	--	13.20*	9.27	--
F-5	--	--	--	93.87*	98.91	--
F-6	--	--	--	4.00	3.42*	--
F-7	--	.0236	--	1.15	0.22*	--
F-8	--	--	.0308	54.53	57.20*	--
F-9	--	--	--	12.48*	10.07	--
F-10	.0881	--	--	58.77*	60.92	--
C-1	--	--	--	92.76*	87.97	--
C-2	--	--	--	13.25*	11.41	--
C-3	--	.0684	--	0.02	0.32*	--
C-4	--	--	.0215	1.07*	0.71	--
C-5	--	--	--	67.34*	62.83	--
C-6	--	--	--	1.98*	1.83	--
C-7	--	--	--	1.41*	1.03	--
C-8	--	--	--	0.00	0.00	--
C-9	--	--	--	4.04	5.16*	--
C-10	.0325	--	--	58.25*	68.99	4-8 < 1-3, 10-12
M	--	.0905	.0796	2.74*	2.60	--
G	--	.0608	.0157	2.77*	2.61	--
SP	--	--	.0981	2.78*	2.69	--
R	--	--	.0869	2.82*	2.72	--
SI	.0049	--	.0615	2.95*	2.86	10-12 < 4-8 1-3< 4-6
	DF = 3, 78	DF = 1, 78	DF = 3, 78	N = 56	N = 31	

+Results of Duncan's New Multiple Range Test.

*Mean associated with expected direction of treatment benefits.

In the analysis for only grades 1-8 (Table 49), significant differences between the treatment means were detected for five variables (F-2, F-7, F-9, M, G) and five others (F-4, C-3, C-4, C-9, SP) approached significance. Of these ten variables, the mean associated with treatment benefits was the experimental mean for eight variables (F-2, F-4, F-9, C-4, C-9, M, G, SP).

DISCUSSION

Direction of Differences

Because multi-variate analysis was beyond the capability of the computer facility available to the researchers, the data was handled in the manner presented above. In an effort to retrieve at least an estimate of the information that would have been available through multi-variate analysis, a supplementary analysis was conducted. In this procedure, the incidence of adjusted post-test means associated with the expected direction of treatment benefits was submitted to Chi-Square analysis.

Very simply, the incidence of means associated with treatment benefits was counted for Training and No-Training conditions in Tables 43, 44, and 48. Chi-Square was calculated separately for each table and for all tables together. Expected incidence for each condition for a table was 12.5 and expected incidence for all tables togehter was 37.50. Table 50 displays the results.

By this analysis using the data for all grades 1-12, for two out of three years, and for all three years together, when only the direction of differences between the means (but not the magnitude of differences) is considered for all variables together, training did make a difference in the expected directions. The results of the Analyses of Co-Variance presented above demonstrated that when the magnitude of differences between the adjusted means is considered, training also made a difference in anticipated directions. This difference was greater for elementary teachers than for secondary teachers.

Magnitude of Change

The next question then becomes, "Is the difference meaningful (not trivial) as well as statistically significant?" To answer this question, it was necessary to look at raw means. Accordingly, the unadjusted means for the group which received two years of training were examined. The unadjusted pre-test mean was subtracted from the unadjusted post-test mean to derive mean change. This mean change was then divided by the unadjusted

Table 49: Significance Levels Less Than .10 by Source of Variation for 25 Analyses of Co-Variance of Grade-Level and Treatment Means on Classroom Functioning Variables for Year 03 Teachers in Grades 1-6

	Min. Sig. Prob. by Source of Variation			Adj. Post-Test $\bar{X}$		Sig. Grade Comparisons+
	Grade	Treatment	G x T	Experi.	Control	
F-1	--	--	--	0.04*	0.00	--
F-2	--	.0325	--	2.30*	0.40	--
F-3	--	--	--	0.10*	0.04	--
F-4	--	.0947	--	14.07*	9.41	--
F-5	--	--	--	93.39*	99.38	--
F-6	--	--	--	4.59	4.05*	--
F-7	--	.0248	--	1.33	0.25*	--
F-8	--	--	.0239	60.93	63.80*	--
F-9	--	.0463	--	11.79*	5.89	--
F-10	--	--	--	51.63*	57.30	--
C-1	.0725	--	--	94.22	86.86*	--
C-2	--	--	--	14.31*	12.72	--
C-3	--	.0830	--	0.02	0.39*	--
C-4	--	.0993	--	0.96*	0.77	--
C-5	--	--	.0146	72.11*	63.19	--
C-6	--	--	--	2.17*	1.91	--
C-7	--	--	--	1.37*	1.26	--
C-8	--	--	--	0.00	0.00	--
C-9	--	.0809	--	6.61*	3.93	--
C-10	.0839	--	--	51.38*	66.67	--
M	--	.0206	--	2.76*	2.55	--
G	--	.0057	--	2.81*	2.50	--
SP	--	.0539	--	2.80*	2.65	--
R	--	--	--	2.84*	2.65	--
SI	.0856	--	--	2.97*	2.84	--
	DF = 2, 62	DF = 1, 62	DF = 2, 62	N = 46	N = 23	

+Results of Duncan's New Multiple Range Test.

*Mean associated with expected direction of treatment benefits.

Table 50: Chi-Square Statistics for Number of Means Associated with Expected Direction of Treatment Benefit for Teachers at All Grade Levels (1-12)

Table Displaying Means	N of Means		Calculated χ^2
	Training	No Training	
Table 43: Year 01 (1-12)	14	11	0.36
Table 44: Year 02 (1-12)	25	0	25.00*
Table 48: Year 03 (1-12)	19	5	7.88*
Total Tables 43, 44, 48	58	32	12.00*

*Significant at $\chi^2_{.05,\ 1} = 3.84$

pre-test mean to yield an index of the magnitude of change in terms of entering levels. The results are displayed in Table 51.

The data displayed in Table 51 supports the following conclusions:

1. The magnitude of the change occurring was large enough to be meaningful.

2. Elementary teachers (grades 1-6) responded better to the training than Secondary teachers (grades 7-12).

3. The major effect of the training was a change in the quality of the interactions between student and teacher with a smaller but supporting change in the proportions of teacher/student participation in classroom verbal interchanges.

Specifically, the larger indexes in Table 51 call attention to those variables in which the largest proportionate mean change occurred. A change of 2.45 for Praise (F-2) is not a large amount but it represents more than twice the amount of Praise exhibited on the pre-test tapes. Similarly an increase in the amount of student thinking (C-7) of 1.93 is not large, but it is a third again as much as on the pre-test. In contrast, a change of 8.81 in student response (F-8) seems large but represents an increase of only 10% over the pre-test tape.

In terms of the process scales, the five levels on the scale are described by the general effect on students of teachers operating at each level as:

1.0 Crippling
2.0 Hurting
3.0 Minimally Effective
4.0 Adding Significantly
5.0 Adding, Encouraging, Exploring[23]

Both elementary and the secondary teachers started in the middle of Level Two, with the secondary teachers higher than elementary teachers. Both groups of teachers moved in desired directions but the change for secondary

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[23] Notation adopted from Carkhuff, R. R. The Art of Helping, Amherst, Massachusetts: Human Resource Development Press, 1973.

Table 51: Magnitude of Change in Experimental Teacher Behavior with 27 Hours of Training in Interpersonal Skills over a 2 Year Period

		2YrX Teachers of Grades 1-6			2YrX Teachers of Grades 7-12		
		Pre-Test X̄	Change X̄	Index	Pre-Test X̄	Change X̄	Index
Teacher Talk	F-1	0.00	0.15	15.00	0.00	0.003	--
	F-2	1.09	2.45	2.25	0.82	0.45	0.52
	F-3	0.97	1.21	1.25	2.50	-0.68*	0.27*
	F-4	21.90	1.97	0.09	20.38	-0.55*	0.02*
	F-5	79.28	-5.97	0.08	113.24	-5.30	0.04
	F-6	11.72	-3.28	0.28	3.92	0.65*	0.16*
	F-7	1.87	1.06*	0.57*	0.45	0.25	0.55*
Student Talk	F-8	78.25	8.81	0.11	60.33	14.67	0.24
	F-9	7.25	11.88	1.64	13.01	2.72	0.20
	F-10	37.84	-18.75	0.49	25.26	-11.39	0.45
Teacher Cogni-tion	C-1	92.41	-5.42	0.05	116.92	-5.15	0.04
	C-2	20.84	-1.57*	0.08*	19.53	-1.55*	0.07*
	C-3	0.22	0.09	0.41	0.07	0.15	2.14
	C-4	0.19	2.94	15.47	0.75	0.98	1.30
Student Cogni-tion	C-5	80.41	16.37	0.20	67.75	14.06	0.20
	C-6	0.81	0.50	0.61	3.60	-1.63*	0.45*
	C-7	1.44	1.93	1.34	7.57	1.83	0.24
	C-8	0.50	-0.40*	0.80*	0.21	0.35	1.66
	C-9	3.45	5.46	1.58	1.45	1.65	1.13
	C-10	40.16	-19.75	0.49	23.52	-11.66	0.49
Inter-Personal Processes	M	2.47	0.68	0.26	2.71	0.32	0.11
	G	2.47	0.65	0.25	2.70	0.28	0.10
	SP	2.41	0.69	0.27	2.74	0.27	0.09
	R	2.66	0.63	0.22	2.75	0.28	0.09
	SI	2.59	0.81	0.30	2.77	0.35	0.12

+ Index = Mean Change ÷ Pre-Test Mean

* Not in expected direction of treatment benefit

teachers was not as great as for the elementary group. However, the amount of change for both groups was enough to put them over the 3.0 threshold.

The changes displayed in Table 51 represent the largest changes achieved during the three project years. Both Year 01 and Year 02 changes (taken separately) were still large enough to be meaningful on variables specific to the training carried out each year. (See discussion below). The Year 03 changes were larger than the changes for either Year 01 or Year 02, taken separately, but not for both together as in the data displayed in Table 51.

Change Related to Training Content

Training for Year 01 concentrated solely on facilitative interpersonal skills. In order to reach the expected treatment benefits, it had been anticipated that there would be a transfer of increased levels of the Process Skills to classroom "learning" interactions dealing with subject matter and content as well as to those more strictly interpersonal interactions occurring. Comparison of training content with the variables in which positive differences occurred for the training groups made it evident that this hypothesis of transfer of skills must be rejected. (See Table 43). Of the eight variables in which significant positive experimental group differences occurred, only one of them (C-2) was in a content-concerned category. Five of the significant differences occurred in the variables (M, G, SP, R, SI) which directly measure the levels of facilitative interpersonal conditions offered in the classroom and two were in the indirect behavior categories of Flanders which are highly reflective of the affective tone of the classroom. This conclusion was supported by the information generated from trend analysis. (See Study 6).

Accordingly, plans for the second year's training were revised. Modules were developed which concentrated on applying interpersonal skills in the "learning" context as well as the "personal" one. These modules were utilized in the training with the 2YrX group. The training modules from the first year were also revised[24] and used with the school which had been rotated into the training condition for the second year of the study.

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[24] Revisions were for effectiveness in accord with subjective evaluations of trainers and trainees. See Aspy, et al. op. cit.

During the second year, movement for the 2YrX group occurred in content oriented measures (specifically: F-3, F-5, F-6, F-9, C-1, C-3, C-4, C-5, C-6, C-7, and C-8) in anticipated directions. Movement on C-2 and C-5 was not in the desired direction. For the 1C2X group (receiving revised modules from first year), movement occurred in F-2, F-3, F-7, F-8, C-5 and the Process Scales towards the desired direction. Comparisons of the means associated with treatment benefit from Table 43 for the experimental group and Table 44 for the 1C2X group indicate that the two groups moved in similar manner in the two years in which they, respectively, received the same content. Similarly, comparisons between the 2YrX and 1C2X groups within Table 44 reflect the different pattern of movement for the two groups during the year in which they received different content.

For Year 03, the training modules from both Years were combined and revised again.[25] The goal was to produce a program which would obtain movement on both interpersonal processes and processes applied to "learning" interactions within one year's training. Although the small N of the Year 03 study resulted in fewer significant differences between the control and experimental groups, comparison of (1) the magnitude of the differences between the means of control and experimental groups in Tables 43 and 48 and (2) comparisons of the patterns of the means associated with treatment benefits in the same two Tables indicate that the Year 03 training did result in movement on both cognitive and affective oriented behaviors. Again, the elementary teachers responded better to the training than did the Secondary teachers.

The number of actual contact hours between NCHE trainer and teacher trainees was 20 hours in Year 01, 18 hours in Year 02, and 21 hours in Year 03. Of this, actual skills training time* was 15 hours in Year 01, 12 hours in Year 02, and 16 hours in Year 03. The remainder of the contact time was utilized in test administration and other procedural matters.

SUMMARY

In conclusion, the findings from this study were:

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[25] For further description of revised program and results of evaluation of Pilot for Year 03 training program, see Study No. 12.

*Presentation of modules.

1. Significant differences were detected between control and experimental groups for all three years of the study.

2. Elementary teachers responded better to the training than Secondary teachers.

3. The changes of experimental groups (teachers receiving Interpersonal Skills Training) were of magnitudes large enough to be both statistically significant and not trivial; i.e., they were meaningful in the real-world.

4. The variables on which movement occurred were directly and positively related to the specific content of the training program and varied when the content varied.

5. The major effect of the training was a change in the quality of the interactions between student and teacher with a smaller but supporting change in the proportions of teacher/student participation in classroom verbal interchanges.

The Interpersonal Skills Training program was demonstrated to produce changes in the Classroom Functioning variables (teacher and student behaviors in classroom/learning interactions). In effect, then, intervention to change the teacher's input to learning interactions resulted in changes in student behaviors in those interactions.

STUDY NUMBER 11

EFFECTS OF TEACHER CHARACTERISTICS OF SEX, RACE, OR YEARS OF TEACHING EXPERIENCE ON POST-TEST MEANS OF CLASSROOM FUNCTIONING

PURPOSE OF STUDY

One of the concerns of the researchers was whether the training was responded to similarly by sub-groups of teachers. Therefore this study posed the question:

> Are teacher characteristics of sex, race, and years of teaching experience significant contributors to differences among the means of Classroom Functioning variables as measured by Flanders' Interaction Analysis Categories, Cognitive Functioning Categories, and Process Scales when those means are adjusted for pre-test scores?

DESIGN

Sample

The sample for this study consisted of all Year 01, Year 02, and Year 03 experimental (Training Condition) teachers who met the inclusion criteria for Study Number 10. Table 52 displays the N by Sex, Race, and Teaching Experience groups.

Data Collection

Data for the study consisted of the Individual's scores on the 10 Flanders' Interaction Analysis Categories, 10 Cognitive Categories, and 5 Process Scales coded from the respective pre and post-test audio recordings of classroom functioning. For Year 01, the pre and post-test tapes were May, 1971 and May, 1972. For Year 02, they were May, 1972 and May, 1973. For Year 03, they were September, 1973 and April, 1974. The data was collected through the normal procedures for assessment of tape data described in Part I. See Table 8, Part I, for names of variables.

Table 52: Distribution of Experimental Teachers by Sex, Race and Years of Teaching Experience within Three Samples

	Group	Yr. 01	Yr. 02	Yr. 03
Sex	Males	16	5	5
	Females	105	47	36
Race	Black American	34	12	26
	White American	87	40	15
Years Teaching Experience	1 Year	10	--	10
	2 Years	11	9	5
	3-7 Years	26	10	10
	8-15 Years	31	12	16
	16-25 Years	25	11	--
	Over 25 Years	18	10	--
	Total N	121	52	41

ANALYSIS

For each year, twenty-five analyses of co-variance were conducted, using in turn each of the Flanders', Cognitive, and Process post-test scores as the dependent variable with pre-test scores as the concomitant variable. Factors were teacher characteristics of sex, race, and years of teaching experience. The groups by characteristic and code number were as follows:

Sex	Years of Teaching Experience
1 - Male	1 - 1 Year
2 - Female	2 - 2 Years
	3 - 3 to 7 Years
Race	4 - 8 to 15 Years
	5 - 16 to 24 Years
1 - Black American	6 - Over 25 Years
2 - White American	

The current school year was counted as 1 year since it would be completed by the time of the post-test. Thus, for number of years experience prior to the current year, subtract 1 from each of the figures above. That is, a "1 year" teacher is in her 1st year of teaching and has had 0 years of prior experience. A "2 years" teacher is in her second year of teaching and has had 1 year of prior experience, etc.

Because Study Number 8 (cf. ante) indicated that there might be some relationship between the teacher's level of physical functioning and the Classroom Functioning variables, the study for Year 03 included the Harvard Step-Test* Scores as a second concomitant variable. Also, the Year 03 analysis did not include tests for interaction effects because of the small N.

RESULTS

Table 53 displays the results of the analyses for all three years. It lists all minimum significant probabilities less than .05 which were detected in the analyses for all 25 variables for each of the three years.

Out of the 25 analyses conducted in Year 01, significant differences at the .05 level were detected in only six variables. Of these, sex showed up as a main effect for four

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*For description of variable and manner of collection, see Study No. 8.

Table 53: Significance Levels Less Than .05 by Source of Variation for 75 Analyses of Co-Variance for Sex, Race, and Teaching Experience Effects on the Classroom Functioning Variables with Pre-Test as Covariate

	Dep. Var.	Min. Sig. Prob. by Source of Variation						Most Responsive Group(s)*	N of MR Group(s)
		Main Effects			Interactions				
		Sex	Race	YTEA	SxR	SxYT	RxYT		
Year 01	F-1	.022	--	--	.004	.002	--	Males/Black/3-7 Yrs.	16/1/4
	F-4	.013	--	--	--	--	--	Females	105
	F-6	.027	--	--	--	--	--	Females	105
	F-9	--	--	.009	--	--	.032	1 Yr./Black 1 Yr.	10/2
	C-2	.02	--	--	--	--	--	Females	105
	C-6	--	--	--	--	--	.030	Black 1 Yr.	2
	DF	1,104	3,104	5,104	1,104	3,104	3,104		
Year 02	F-5	.018	--	--	--	--	--	Females	47
	C-1	.034	--	--	--	--	--	Females	47
	C-3	--	--	--	--	.039	--	Females, 15-24 Yrs.	9
	C-4	.054	--	--	--	.001	--	Males/Male 2 Yrs.	5/1
	C-7	--	--	--	--	.016	--	Male 2 Yrs.	1
	DF	1, 37	1, 37	5, 37	1, 37	2, 37	3, 37		
Year 03	F-9	.016	--	--				Males	5
	C-6	.007	--	--				Males	5
	DF	1, 33	1, 33	3, 33					

*Results of Duncan's New Multiple Range Test.

variables. Years of teaching experience was a significant contributor to differences between the means for only three variables -- once in main effects and three times in interactions. Race showed up only twice, both times in interactions.

For Year 02, race did not appear at all. Sex showed up in main effects three times and three times in interactions with years of teaching experience.

Sex was the only significant source of variation for Year 03. It showed up twice. The regression coefficient for the Harvard Step-Test was not significant ($p < .05$) for any variable.

DISCUSSION

In general, it appeared that most sub-groups were equally responsive to the training. Out of the 75 analyses conducted with the data from training groups over a three year period and two states, significant differences between the means of sub-groups were detected 13 times. Two of these thirteen analyses (and three interaction effects in other analyses) have to be discounted because of the small size of the sub-groups.* The remaining eleven analyses are a few more than could have been expected by chance, but the information generated in these analyses was not systematic.

According to the main effects detected in the remaining eleven analyses, the most responsive group was females in five analyses, males in four analyses, and first year teachers in one analysis. Interaction effects indicated male teachers with 3-7 years experience in one analysis and female teachers with 15-24 years experience in another analysis as the groups most responsive to training. Of these eleven analyses, the only variable that appears in more than one year is F-9.

SUMMARY

In conclusion, the finding from this study is that there is no systematic differential response to Interpersonal Skills

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*The results of the analyses for C-6 (Year 01) and C-7 (Year 02) were discounted because of group N's of 1 and 2 respectively. Interaction effects for black males in F-1 (Year 01), Black teachers with 1 year experience in F-9 (Year 01), and Males with 2 years experience in C-4 (Year 02) were also discounted because of small N's.

training by sub-groups of teachers differentiated according to teacher characteristics of race, sex, or years of teaching experience.

STUDY NUMBER 12

RELATIVE EFFECTIVENESS OF THREE VERSIONS OF INTERPERSONAL SKILLS TRAINING

PURPOSE OF STUDY

The researchers had developed two sets of training modules by Year 02. Set one focused on the interpersonal process skills per se. They had been administered to the Year 01 experimental (Training Condition) teachers and a revision of this set would be administered to a new group of experimental trainees during Year 02. A second set of modules focused on training teachers to apply increased levels of interpersonal process skills in classroom "learning" interactions (rather than just "personal" ones) and would be applied as a second year of training for the experimental teachers from Year 01. In preparation for the third year of the study, the researchers developed and piloted a program that combined sets one and two into a one-year program rather than a two year program. Since the researchers were concerned with the relative effectiveness of this pilot (Program 2) in achieving increased levels of interpersonal skills, it was evaluated against the gains made by the teachers receiving Program 1 (Set One) training in Year 01 and in Year 02 (revised Set one). The question proposed for this study was:

> Can significant differences be detected between the post-test response means of treatment groups receiving different versions of Interpersonal Skills Training when Analysis of Co-Variance is conducted on the Classroom Functioning Variables with pre-test standing as the concomitant variable?

DESIGN

Sample

There were three groups in this study. Group P1Y1 consisted of all the experimental teachers in grades 1-6 who received Program one in Year 01. Group P1Y2 consisted of all the teachers who received Program one (revised) in Year 02. This included all the 1C2X teachers (See Study No. 10) and all other new teachers in the experimental

elementary schools for the basic project; i.e. all teachers who were receiving their first year of Interpersonal Skills Training in Year 02. The third group (P2Y2) consisted of the faculty of a school not in the basic research project which had consented* to receive pilot Program 2 during Year 02. The bottom line of Table 54 displays the N by group.

Data Collection

Data for the study consisted of the individual's scores on the 10 Flanders' Interaction Analysis Categories, 10 Cognitive Categories, and 5 Process Scales coded from the respective pre- and post-test audio recordings of classroom functioning. For group P1Y1, the pre-and post-test tapes were May, 1971 and May, 1972. For group P1Y2, they were May, 1972 and May, 1973. For group P2Y2, they were September, 1973 and May, 1973. The data was collected through the normal procedures for assessment of tape data described in Part I. See Table 8 for names of variables.

ANALYSIS

Since there were two programs and two years, a two-way analysis of co-variance was conducted. The dependent variables were the individual's post-test scores on the Flanders, Cognitive, and Process variables with pre-test scores as co-variate. Factors were Year (01 and 02) and Program (1 and 2) with the cell for Program 2 Year 01 being an empty cell.

RESULTS

Table 54 displays the results of the twenty-five analyses of co-variance which were conducted. It presents all sources of significance less than .05 which were detected in the 25 analyses. The mean associated with the expected direction of treatment benefit is indicated with an asterisk. (These expected directions were specified on the basis of Response Surface Analysis carried out in Study No. 9 and were discussed in Study No. 10).

Significant differences between Program means were detected for eight variables (F-3, F-9, F-10, C-6, C-10, SP, R, SI). The mean associated with the treatment benefit in seven of the eight variables was for Program Two.

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*Through "informed consent" procedures.

Table 54: Significance Levels Less Than .05 by Source of Variation for 25 Analyses of Co-Variance for Program and Year Effects on the Classroom Functioning Variables with Pre-Test as Covariate

	Min. Sig. Prob. by Source of Variation		Adj. Post-Test Means		
	Program	Year	P1Y1	P1Y2	P2Y2
F-1	--	--	.00	.05*	.00
F-2	--	.002	6.52*	1.52	2.99
F-3	.0077	.0001	1.99*	1.58	.14
F-4	--	--	21.00*	17.52	20.35
F-5	--	--	65.45*	68.23	79.46
F-6	--	.0048	12.05	4.65*	6.50
F-7	--	.0410	2.48	.84	.05*
F-8	--	.0210	50.99	86.76*	56.31
F-9	.0001	.0001	7.00	12.54	19.80*
F-10	.0025	.0001	41.00	22.09	14.31*
C-1	--	--	90.12	71.79*	87.38
C-2	--	--	18.67	18.72	20.09*
C-3	--	--	0.02*	0.00	0.00
C-4	--	--	1.36	0.19	2.04*
C-5	--	.0001	53.37	99.75	110.47*
C-6	.0002	--	.85	1.15	1.27*
C-7	--	--	1.39	.23	3.00*
C-8	--	--	.02	.0	0.00
C-9	--	--	3.55*	2.21	2.13
C-10	.0058	.0002	39.94	20.43	13.61*
M	--	--	2.36	2.38	2.63*
G	--	.0453	2.32	2.37	2.58*
SP	.0166	--	2.28	2.35	2.72*
R	.0474	--	2.36	2.43	2.72*
SI	.0194	.0147	2.40	2.63	2.88*
	DF = 1, 123	DF = 1, 123	N = 86	N = 19	N = 22

* = Mean assocaited with expected direction of treatment benefit.

Significant differences between Year means were detected for eleven variables. In nine variables, the mean associated with the treatment benefit was a Year 02 mean. Within Year 02, the "best" mean was achieved by the P1Y2 group for variables F-6 and F-8. In the other seven variables, the "best" group mean within Year 02 was achieved by the P2Y2 group.

In all, there were fourteen variables for which the analysis detected significant differences between either Program means or Year means. In these fourteen variables, the group mean associated with the expected direction of treatment benefits was achieved by the P1Y2 group two times, by the P1Y2 group two times, and by the P2Y2 group nine times.

DISCUSSION

No conclusion was drawn as to the relative effectiveness of the original and the revised versions of Program 1 from this analysis, although the revised version seemed to be slightly more effective. In nine of the 11 analyses in which significant differences were detected between Year means, the direction of treatment benefits were associated with Year 02 means. When just the means for the two groups (P1Y1 and P1Y2) are compared for direction of treatment benefit, sixteen of the P1Y2 means are in the desired direction. However, when the means for all three groups are compared in this manner, the P1Y1 group did achieve two more means associated with the direction of treatment benefit than did the P1Y2 group, but they were not significant for either Program or Year factors.

Program Two in Year 02 had fourteen means associated with the direction of treatment benefit and ten of these were for variables in which Analysis of Co-Variance detected significant differences between either Program means or Year means. For 7 of eight variables in which significant differences between Program means were detected, the group receiving Program 2 in Year 02 achieved the mean associated with treatment benefit. It was concluded that Program Two (combining modules which focused on interpersonal skills with modules focusing on applying the skills within a one year program) was more effective than either version of Program One.

SUMMARY

No conclusion was drawn as to the relative effectiveness of the original and the revised versions of Program One. However, it was concluded that Program Two was more effective than either version of Program One. Accordingly, it was determined that the training Program for Year 03 should combine (in a one year program) modules which focused on increasing levels of interpersonal skills with modules focusing on applying the skills in "learning" interactions.

STUDY NUMBER 13

EFFECT OF PRIOR TRAINING OF SCHOOL PRINCIPAL ON TEACHER RESPONSE TO INTERPERSONAL SKILLS TRAINING

PURPOSE OF STUDY

As a result of Studies Number 1 and 2, the researchers had hypothesized that teacher response to interpersonal skills training would be enhanced by prior training of the school principal (or other local instructional leader) in the same skills. Since one of the experimental school principals in Year 03 had previously taken a graduate course ("Effective Teaching" taught by one of the researchers) in which most of the content of the training modules had been covered, the data from his teachers offered the possibility of a small N testing of the above hypothesis. Accordingly, the following question was posed:

> Can significant differences be detected between grade-level or treatment post-test means for the Classroom Functioning Variables as measured by Flanders' Interaction Analysis Categories, Cognitive Functioning Categories, and the Process Scales when post-testing means are adjusted for pre-test standing?

DESIGN

Sample

The sample consisted of three groups of Year 03 teachers who met the inclusion criteria for Study No. 10. Group XwTP were Year 03 experimental (Training Condition) teachers whose principal had received prior training in Interpersonal Skills. The second group (Xw/oP) were Year 03 experimental (Training Condition) teachers whose principals had not received prior training in Interpersonal Skills. The third group were Year 03 control (No-Training) teachers.

Since the school whose principal had received prior training was a Middle School (grades 4-8), the study was restricted to teachers teaching on those grade levels. Total N was 47. The N by treatment groups is displayed on the bottom line of Table 55.

Table 55: Significance Levels Less Than .05 by Source of Variation for 25 Analyses of Co-Variance for Grade Level and Treatment Effects on Classroom Functioning Variables with Pre-Test as Covariate

	Min. Sig. Prob. by Source of Variation			Adj. Post-Test Means		
	Grade	Treatment	G x T	XwTP	X w/o P	Control
F-1	--	--	--	.04*	0.00	0.0
F-2	--	--	--	2.32*	1.58	0.15
F-3	--	.0479	--	0.19*	0.01	0.00
F-4	--	--	--	14.41	17.19*	9.65
F-5	--	.0171	--	97.94*	104.27	110.44
F-6	--	--	--	4.78*	4.86	5.33
F-7	--	--	--	1.06	0.40*	3.47
F-8	--	--	.0110	59.79	69.83*	59.14
F-9	--	.0474	--	13.33*	9.33	5.56
F-10	--	--	.0209	46.81	31.13*	50.60
C-1	--	--	--	99.09*	109.23	100.02
C-2	--	--	--	15.34	17.42*	12.12
C-3	--	--	--	0.00	0.00	0.43*
C-4	--	--	--	1.14*	0.02	0.74
C-5	--	--	.0089	73.06	75.63*	64.35
C-6	--	--	--	2.92*	1.33	1.86
C-7	--	--	--	1.79*	1.33	0.99
C-8	--	--	--	0.00	0.00	0.00
C-9	--	--	--	3.81*	5.64	5.64
C-10	--	--	--	44.73	31.02*	53.45
M	--	--	--	2.98*	2.78	2.62
G	--	.0103	--	3.05*	2.79	2.61
SP	--	--	--	3.02*	2.86	2.69
R	--	.0459	.1014	3.07*	2.92	2.72
SI	--	--	--	3.21*	3.06	2.85
	DF = 1, 40	DF = 2, 40	DF = 2, 40	N = 20	N = 13	N = 14

* = Mean associated with expected direction of treatment benefit.

Data Collection

Data for the study consisted of the individual's scores on 10 Flanders Categories, 10 Cognitive Categories and 5 Process Scales from pre- and post-test audio recordings of Classroom instruction. For all groups, the pre-test was the September, 1973 tape and the post-test was the April, 1974 tape. Data was collected in the regular manner for assessment of tape data described in Part I. For names of the variables, see Table 8 in Part I.

ANALYSIS

Twenty-five Analyses of Co-variance were conducted using, in turn, each of the Flanders, Cognitive and Process post-test scores as dependent variables with pre-test scores as the concomitant variable. Factors were Treatment and Grade-level. There were three treatment groups: XwTP (training condition teachers with prior trained principal), Xw/oP (training condition teachers without trained principal), and Control (No-Training condition) teachers. Grade-level groups were (1) teachers in grades 4-6 and (2) teachers in grades 7-8.

RESULTS

Table 54 displays the results of the analyses. It presents all sources of significance less than .05 which were detected in the 25 analyses. The mean associated with the expected direction of treatment benefit is indicated with an asterisk. (These expected directions were specified on the basis of Response Surface Analysis carried out in Study No. 9 and were discussed in Study No. 10).

For 16 out of the 25 variables, the adjusted treatment mean associated with expected directions of treatment benefit was that of the XwTP group. Six of the remaining variables were accounted for by the other experimental group. In only one variable (C-3) was the control mean associated with the expected direction of treatment benefit.

Significant differences between treatment means were detected for five variables: F-4, F-5, F-9, G, R. For all five of these variables, the adjusted post-test mean associated with the expected direction of treatment benefit was the XwTP mean.

There were no significant grade-level main effects. Grade by treatment interaction effects were detected for only four variables.

DISCUSSION AND SUMMARY

In spite of the small N for the study, the null hypothesis of no difference among the treatment means was rejected in five instances and in each case the group with the mean associated with treatment benefits was that of the experimental teachers whose principal had received prior training in the Interpersonal Skills in which the teachers were subsequently trained. Furthermore, this group of teachers had the mean associated with the expected direction of treatment benefit for sixteen out of 25 variables. The researchers concluded that the alternative hypothesis was sufficiently supported and that, in fact, prior training of the principal enhances teacher response to interpersonal skills training.

STUDY NUMBER 14

THE CLASSROOM FUNCTIONING VARIABLES AS PREDICTORS OF CHANGE ON STUDENT OUTCOME MEASURES OF ABSENTEEISM, SELF-CONCEPT, AND ACHIEVEMENT

PURPOSE OF THE STUDY

This study posed two questions:

1. When Student Outcome Measures of change have been adjusted for pre-test standing, will multi-linear regression analysis detect significant relationships between the adjusted change measures and the Classroom Functioning variables?

2. Which Classroom Functioning variables are the better predictors of the adjusted change measures?

DESIGN

Sample

The Teacher sample for this study included all Year 01 experimental and control classroom teachers who submitted four or more tapes during the year. "Special teachers" (art, music, speech therapy, etc.) were not included and the study was restricted to Math and English Teachers at the Secondary level. The student sample was formed of all students who (1) had been taught by "included" teachers and (2) had taken pre- and post-tests of student outcome measures. Table 56 displays student and teacher N by grade level.

Data Collection

Data for the independent variables in the study were the individual's scores on all submitted audio tape recordings of classroom instruction on each of the 10 Flanders' Interaction Analysis Categories, 10 Cognitive Functioning Categories, and 5 Process Scales. The data was collected by the regular procedures for assessment of Tape data described in Part I.

The dependent variables were pre-and post-test measures on Metropolitan Achievement Tests (for students in grades 1-6),

Table 56: Distribution of Sample for Study 14 by Grade Level

Grade Levels		Teacher N	Student N
1		20	442
2		22	488
3		21	451
4		21	492
5		23	532
6		15	485
7-12	Math	16	1,365*
	Engligh	18	2,113
Total		156	5,003

*These students contained within English N.

California Achievement Tests (for students in grades 7-12), How I See Myself Tests (students in grades 3-12), and total days absent for the year (for all students). The pre-tests were administered in November, 1971 and the post-tests in April, 1972 by the students' regular classroom teachers and scored by the test publishers.

ANALYSIS

Sixty-four multi-linear regression analyses were carried out. The dependent variables were adjusted change* scores on student tests. Table 59 lists the dependent variables. Separate analyses were carried out for grade levels, 1, 2, 3, 4, 5, 6, and 7-12. Grades 7-12 were run as one level because of organizational factors of the schools; i.e., all students changed classes thus limiting the number of teachers in a particular subject matter to two or three per grade.

Independent variables were means and standard deviations of measures of selected Classroom Functioning Variables. The teacher's Grand Mean** for the year was used as a measure of average level of functioning. The standard deviation of the teacher's scores around his own mean was used as an estimate of stability of functioning. In all there were 28 Independent Variables, as follows:

$\bar{X}$ and $\hat{\sigma}$ of F-1:	Accepts Student Feelings
$\bar{X}$ and $\hat{\sigma}$ of F-2:	Use of Praise and Encouragement
$\bar{X}$ and $\hat{\sigma}$ of F-3:	Accepts Student Ideas
$\bar{X}$ and F-6	Give Directions or Commands
$\bar{X}$ and $\hat{\sigma}$ of F-7:	Use of Criticism and Justification of Authority
$\bar{X}$ of F-9:	Student Initiated Response
$\bar{X}$ of C-1:	Teacher Recalls Facts

*Adjusted change was post-test minus pre-test to yield raw change which was then adjusted for pre-test standing. This was done for all variables except (1) first grade tests where absolute post-test scores were used as no pre-test data was available and (2) absence where total days absent was the dependent variable.

**Grand Mean = average over all tapes submitted.

$\bar{X}$ Of C-2:	Teacher Asks for Facts
$\bar{X}$ and $\hat{\sigma}$ of C-3:	Teacher Thinks
$\bar{X}$ and $\hat{\sigma}$ of C-4:	Teacher Asks for Thinking
$\bar{X}$ of C-5:	Student Recalls Facts
$\bar{X}$ Of C-6:	Student Asks for Facts
$\bar{X}$ of C-7:	Student Thinks
$\bar{X}$ of C-8:	Student Asks for Thinking
$\bar{X}$ and $\hat{\sigma}$ of M:	Teacher's Understanding of Meaning to Student of Classroom Experiences
$\bar{X}$ and $\hat{\sigma}$ of G:	Teacher's Genuineness in Person-to-Person Interactions
$\bar{X}$ of SP:	Teacher's Promotion of Success of Student's Goals
$\bar{X}$ of R:	Teacher's Respect for Students
$\bar{X}$ and $\hat{\sigma}$ of SI:	Student's Involvement in Learning Activities

In carrying out the regressions, the measures of each teacher's functioning were regressed against the Mean Change on the dependent variable for the students taught by that teacher. Therefore, degrees of freedom for each analysis were based on N of classrooms (teachers) rather than N of students. Since the N of classrooms was in all cases smaller than the number of independent variables to be considered, the computer was programmed to halt computation when the degrees of freedom for regression were equal to residual degrees of freedom minus one.

RESULTS

Prediction of Change

The R-squares displayed in Table 57 represent the amount of remaining variance predicted by Classroom Functioning variables after the variance due to Pre-test Standing had been removed. In other words, once you have accounted for change related to where the student was on entering, then these R-squares tell you how good teacher behavior was as a predictor of change. All regressions for which R-square is reported were significant at $p < .05$.

Table 57: Results of Multilinear Regression Analysis: Variation (R^2) in Adjusted* Mean Gain Predicted by Teacher Behavior Factors

	Dependent Variables	Grade Levels						
		1	2	3	4	5	6	7-12
Self-Concept Factors	Teacher School Acceptance	X	X	.41**	.23	.53	.61	.73
	Physical Appearance	X	X	.78	NS	.64	.45	.82
	Interpersonal Adequacy	X	X	.81	NS	.85	.48	.86
	Autonomy	X	X	.63	.19	.75	.45	.88
	Academic Adequacy	X	X	.29	.14	.73	.59	.84
	Total Days Absence	.71	.84	NS	.14	.42	.38	.54
Achievement	Reading Vocabulary	.68	.35	.83	.50	.75	X	X
	Reading Comprehension	.43	.80	.89	.88	.42	X	.39
	Word Analysis	NS	.37	.90	X	X	X	X
	Language Usage	X	X	X	.85	.88	X	.39
	Language Mechanics	X	X	X	X	X	X	.59
	Spelling	X	X	.84	.53	.70	X	X
	Math Computation	X	X	.73	.56	.64	X	.86
	Math Concepts	X	X	.86	.35	.15	X	.78
	Math Problem-Solving	X	X	.83	.42	.72	X	X

X = No data at this level on this variable

NS = Regression not Significant at acceptable level ($p < .05$)

*Adjusted for Pre-test standing except 1st grade data uses absolute post-test standing (no pre-test available) and Total Days Absence uses raw totals.

**Numbers Represent R^2

Classroom Functioning as a predictor of change varied with the dependent variable and with the grade level. However, there were several patterns in the data presented in Table 57.

First, teacher functioning was a good predictor of absolute standing at the end of the year for first grade students, in all areas except word analysis skills.

Second, except for the third and fourth grades, teacher functioning was a good predictor of the total days absent for her students. The relationship was an inverse one for all predictors except F-6 and F-7. The same trend was observed in third and fourth grades but it did not reach significance in the third grade regression and was not a high predictor at the fourth grade level.

Third, in general, teacher functioning was not as good a predictor of student gain in the fourth grade as it was for the other levels of students.

Fourth, above the fourth grade, teacher functioning was a better predictor of gain in skills than of gain in concepts. For example, in grades 7-12, the R-square for Language Mechanics was .59 but was only .39 for Language Usage. For Math Computation, the MCR square was .86 but, for Math Concepts, it was .78. The same situation was observed at grade 5. Reading Vocabulary was .75 and Comprehension was .42; Math Computation was .64, Math Problem-Solving was .72, and Math Concepts was .15. At the fourth grade level, prediction of change in Math followed the same pattern but not in reading. Below the fourth grade level, only the prediction of post-test standing for first grade follows the pattern, with Reading Vocabulary registering an R-square of .68 and first grade Reading Comprehension registering .43.

Identification of Predictors

The regression equations were examined to determine the relative predictive power of the independent variables. The dependent variables were grouped in three categories: (1) Absence, (2) Self-Concept Measures, and (3) Achievement Measures. Then the regression equations for each category were examined and the number of times a variable appeared as a predictor of change in regression equations at each level for each category was counted. This was divided by the number of equations for the category to get the percent of equations for the category in which the variable appeared as a predictor of gain. This operation was repeated for each category and for the total of all categories. The results are displayed in Table 58.

Table 58: Percent of Equations for Category in which Variable Appears* as a Significant Predictor of Gain

	Independent Variables	CATEGORY & LEVEL PREDICTED								
		ABSENCE		SELF-CONCEPT		ACHIEVEMENT		ALL CATEGORIES		
		EL.	SEC.	EL.	SEC.	EL.	SEC.	EL.	SEC.	1-12
Teacher Behaviors	F-1	20%	--	16%	20%	42%	--	30%	9%	26%
	F-2	20	200%+	50	20	30	40%	36	45	38
	F-3	20	--	22	--	30	40	26	18	25
	F-6	--	100	33	20	23	--	24	18	23
	F-7	40	--	33	20	46	80	40	45	41
	C-1	--	--	--	--	3	--	--	--	--
	C-2	20	--	11	--	23	--	18	--	15
	C-3	20	--	44	40	15	20	26	27	26
	C-4	40	--	--	40	19	20	14	27	16
Interpersonal Processes	Meaning	20	100	11	40	34	20	24	36	26
	Genuineness	40	100	11	--	34	--	26	9	23
	Success Promotion	20	--	5	--	3	--	6	--	5
	Respect	20	--	--	--	7	--	6	--	5
	Student Involvement	20	--	38	40	15	20	24	27	25
Student Behaviors	F-9	20	100	22	--	30	60	22	36	25
	C-5	--	--	11	--	15	20	12	9	11
	C-6	--	100	16	20	34	--	24	9	21
	C-7	--	--	11	--	34	40	22	18	21
	C-8	--	--	22	20	38	--	28	9	25
N of Equations		5	1	18	5	26	5	49	11	60

EL: Elementary (1-6)

SEC: Secondary (7-12)

*Variable is counted as appearing if either $\bar{X}$ or $\hat{\sigma}$ appeared as predictor in regression.

+Variable appeared as both $\bar{X}$ and $\hat{\sigma}$ in the regression.

Single Predictors

The most highly predictive single variables were F-1, F-2, F-3, F-7, F-9, C-3, C-8, M and SI. Cognitive 1 (Teacher Recalls Facts) was a predictor only for elementary Achievement and was negatively correlated with achievement. Cognitive 2 (Teacher Asks for Facts) was predictive for elementary students but not for secondary students. Of the Student Behavior variables, the most highly predictive were F-9 (Student Initiates) and Cognitive 8.

Predictive Clusters

To simplify this rather complex picture of the relative predictive power of the variables, the independent variables were grouped into four clusters according to the kind of behavior being measured. Then for each category of dependent variables, the predictive appearances of the independent variables were summed over each cluster and divided by the total number of predictive appearances of all variables for the category. This provided a picture of the relative power of the different clusters of Classroom Functioning Variables in predicting change. The results are displayed in Table 59.

The teacher's Cognitive Behaviors had relatively little predictive power except for Self-Concept at the secondary level. The Teacher's Specific Affective Behaviors and the Process Scales appeared more frequently as predictors than either Student Behavior or Teacher's Cognitive Behaviors. However, Student Behavior measures were frequent predictors of gain in Achievement. The percentage of predictive appearances of Student Behavior in Achievement regressions was almost the same for the Elementary and the Secondary levels although comparing the two levels reveals discrepant percentages for Student Behavior in Absence and Self-Concept Regressions.

Average Level vs. Stability of Functioning as Predictor

Tables 58 and 59 dealt with total appearances of a variable regardless of whether it appeared as a Mean (average level of teacher's functioning on that variable) or as a Standard Deviation (stability of teacher's functioning on that variable). Tables 60 and 61 deal with the predictive appearances of the two kinds of measures for the variables.

In Table 60, the process used to produce Table 3 was repeated, except that for Table 60 only the appearances of standard deviations of the variables were counted for each cluster and divided by the total number of all (both $\bar{X}$ and $\hat{\sigma}$) appearances. This provided a picture of the percentage of

Table 59: Percent of Total Predictive Appearances in Category by Variable Clusters for School Level

Variable Cluster (Groupings of Independent Variables)	Level and Category Predicted					
	ABSENCE		SELF-CONCEPT		ACHIEVEMENT	
	EL.	SEC.	EL.	SEC.	EL.	SEC.
Specific Affective Behaviors	31%	42%	44%	28%	36%	44%
Teacher Cognitive Behaviors	25%	-0-	15%	28%	11%	11%
Process Scales	37%	29%	19%	28%	21%	12%
Student Behaviors	7%	29%	20%	16%	32%	33%

Specific Affective Behaviors:

F-1: Accepts Feelings
F-2: Uses Praise
F-3: Accepts &/or Uses Student Ideas
F-6: Gives Instructions
F-7: Justifies Authority

Process Scales:

Meaning, Genuineness, Respect for Student, Success Promotion, Student Involvement

EL: Elementary (1-6)
SEC: Secondary (7-12)

Teacher Cognitive Behaviors:

C-1: Teacher Recalls Facts
C-2: Teacher Asks for Facts
C-3: Teacher Thinks
C-4: Teacher Asks for Thinking

Student Behaviors:

F-9: Student Initiates
C-5: Student Recalls Facts
C-6: Student Asks for Facts
C-7: Student Thinks
C-8: Student Asks for Thinking

Table 60: Percent of Predictive Appearances in Category (by Variable Cluster per Level) that is Accounted for by Stability of Teacher Functioning Factors

Variable Cluster (Groupings of Independent Variables)	Level and Category Predicted					
	ABSENCE		SELF-CONCEPT		ACHIEVEMENT	
	EL.	SEC.	EL.	SEC.	EL.	SEC.
Specific Affective Behaviors	25%	14%	11%	14%	16%	22%
Teacher Cognitive Behaviors	12%	-0-	6%	14%	2%	-0-
Process Scales	6%	29%	11%	7%	13%	12%
Student Behaviors	-0-*	-0-	-0-	-0-	-0-	-0-

Specific Affective Behaviors:

F-1: Accepts Feelings
F-2: Uses Praise
F-3: Accepts &/or Uses Student Ideas
F-6: Gives Instructions
F-7: Justifies Authority

Process Scales:

Meaning, Genuineness, Respect for Student, Success Promotion, Student Involvement

EL: Elementary (1-6)
SEC: Secondary (7-12)

Teacher Cognitive Behaviors:

C-1: Teacher Recalls Facts
C-2: Teacher Asks for Facts
C-3: Teacher Thinks
C-4: Teacher Asks for Thinking

Student Behaviors:

F-9: Student Initiates
C-5: Student Recalls Facts
C-6: Student Asks for Facts
C-7: Student Thinks
C-8: Student Asks for Thinking

*No Stability Measures of Student Behavior Variables were included in the Analysis.

Table 61: Proportion of Predictive Appearances in Category by Variable Cluster Per Level that is Accounted for by Stability of Teacher Functioning Factors

Variable Cluster (Groupings of Independent Variables)	Level and Category Predicted					
	ABSENCE		SELF-CONCEPT		ACHIEVEMENT	
	EL.	SEC.	EL.	SEC.	EL.	SEC.
Specific Affective Behaviors	.80	.33	.25	.50	.46	.50
Teacher Cognitive Behaviors	.50	-0-	.40	.50	.21	-0-
Process Scales	.16	1.00	.57	.25	.68	1.00

Specific Affective Behaviors:

F-1: Accepts Feelings
F-2: Uses Praise
F-3: Accepts &/or Uses Student Ideas
F-6: Gives Instructions
F-7: Justifies Authority

Process Scales:

Meaning, Genuineness, Respect for Student, Success Promotion, Student Involvement

Teacher Cognitive Behaviors:

C-1: Teacher Recalls Facts
C-2: Teacher Asks for Facts
C-3: Teacher Thinks
C-4: Teacher Asks for Thinking

EL: Elementary (1-6)
SEC: Secondary (7-12)

Predictive Appearances in Category that is accounted for by the stability of teacher functioning.

In Table 61, the relative predictive power of the two kinds of measures for the independent variables (average level of functioning and stability of functioning) is emphasized. It displays the ratio (proportion) of appearances of the stability measures to the total appearances of the variables. By examining this table, it was apparent that the stability of the teacher's functioning in the Process Levels was more important to secondary school students than to elementary students except in predicting self-concept changes. However, the stability of the Specific Affective Behaviors was more important than average level of functioning in predicting the Absence of elementary students. Compare this with the proportion for prediction of Absence by stability of Process levels. With a proportion of .16, it is evident that it is the average level of Interpersonal Process functioning that is more important for the elementary student.

DISCUSSION

General Relationships

In all but four of the 64 multi-linear regression analyses conducted in this study, the Classroom Functioning Variables were related to the student outcome measures at levels of significance less than .05. R-squares achieved in the significant regressions ranged from .14 to .88.

The relationships reported in this study are somewhat stronger than those reported for similar studies by previous investigators. Factors related to the added strength of the relationships reported here include the following:

1. The independent variables were measures of the actual processes occurring in the learning situation rather than presage characteristics of the teacher, the students, the curriculum, or the learning context.

2. The independent variables were generated from repeated measures of the processes occurring in the learning situation, thus providing (1) an average level of functioning for the year and (2) an estimate of stability of functioning for the year.

3. The dependent variables were not change for individual students but were mean change for all the students taught by the teacher.

4. The R-squares reported are for a component of the total variance; i.e., the variance remaining after the variance due to pre-test standing has been adjusted for.

Although the specific relationships between the Classroom Functioning Variables and the Change measures varied considerably from grade to grade and from test to test, the data presented here seems to indicate that the teacher's level of functioning is an important contributor to student change as it accounted for one-quarter to nine-tenths of the variance for all but eight of the relationships tested. (See Table 57). The generally low R-squares for the fourth grade (in comparison to the other grades) are interesting and it is hypothesized that these may be related to the "fourth grade slump" in creativity and achievement reported by other researchers.

Specific Patterns

Of particular interest to the researchers were the relationships between the Classroom Functioning variables and student absenteeism. As indicated in Table 59, the Specific Affective Behaviors and the Process Scales were the most frequent predictors of absence at both the elementary and the secondary levels with Student Behavior variables having an equal importance at the secondary level. Examination of the regression equations indicate that student absenteeism increases when process levels, number of questions asked by the teacher, praise, acceptance of student ideas, and acceptance of student feelings are lowered or when criticism is high. Similarly, there is an inverse relationship between absenteeism and student initiation and students asking for facts. Put simply, this means that when the teacher is functioning at high levels of acceptance and responsiveness to students, they miss fewer days of school during the year.

The second interesting pattern of relationships displayed in Table 57 is the systematically higher R-squares for skills tests compared to measures of more abstract kinds of learning for grades 1, 4, 5, and 7-12. In terms of this data, it would seem that, at the upper grade levels, the teacher has a more direct effect on students' attainment of specific skills than on their attainment of concepts or more abstract processes. That this pattern is also reflected in grade 1 reading but not in grades 2 and 3 may be an effect of the nature of first grade reading instruction.

The researchers had hypothesized that the Classroom Functioning variables would have stronger relationships with the Self-Concept Factors than with achievement tests. However, this hypothesis had to be rejected as the average

of the R-square for all Self-Concept regressions was .55 while the average for the Achievement regressions was .62. In effect, the Classroom Functioning variables were equally effective predictors for change on both the Self-Concept Factors and the Achievement tests.

Relative Predictive Power of Variable Clusters

Table 59 presents the relative predictive power of the different kinds of Classroom Functioning variables. For elementary students (grades 1-6) the Specific Affective Behaviors are most important, followed by Student Behaviors and Process Scales with the Teacher's Cognitive Behaviors contributing less to the variation of both Self-Concept and Achievement measures. Of the Student Behaviors, the most predictive were F-9 (Student Initiates) and C-8 (Student Asks for Thinking) indicating the importance of student participation and student direction setting in learning. Examination of the regression equations indicate that the relationships are in similar directions to those for Absenteeism; i.e., positive gain is positively related to the Classroom Functioning variables except F-6, F-7, and C-1. When F-7 and C-1 appear as predictors, they are usually negatively correlated. F-6 is positively correlated with elementary student gain and negatively correlated with secondary student gain.

The data presented in Table 61 as to the proportion of predictive appearances of the variables which were contributed by the stability of functioning factors indicates that both stability (the teacher offers relatively the same levels of functioning; i.e., has a small standard deviation around his own mean) and average level of functioning were of equal importance for about half of the relationships. However, the stability of the Specific Affective Behaviors were more frequent predictors of elementary Absenteeism than the average level of functioning while for the secondary students the stability factors were the only Interpersonal Process factors which predicted either Absenteeism or Achievement. Stability factors did not account for a large proportion of the appearances of Teacher Cognitive Behaviors as predictors of change in student outcomes.

SUMMARY

In conclusion, the findings from this study were:

1. The Classroom Functioning variables are good predictors of student change when raw change is adjusted for pre-test standing.

2. When the teacher is functioning at high levels of acceptance and responsiveness to students, students miss fewer days of school during the year.

3. At the upper grade levels, the teacher has a more direct effect on students' attainment of specific skills than on attainment of concepts or more abstract processes.

4. The Classroom Functioning variables were equally effective predictors for change on both Self-Concept factors and Achievement tests.

5. Both the stability of the teacher's functioning and the average level of functioning on Specific Affective Behaviors and Process Scales are important predictors of change but the relative importance of the two kinds of measures of teacher functioning vary with the kind of gain predicted and the grade level of the student.

6. The stability of the teacher's functioning in the Cognitive Behaviors was not an important predictor of change, but average level of functioning was.

7. Student gain (positive change) was positively related to the Classroom Functioning variables except F-7 and C-1 which were inversely related while F-6 was positively related for elementary students and inversely related for secondary students.

The conclusion of the researchers from this study was that higher functioning teachers produce more gain in student measures of Self-Concept and Achievement and their students are absent fewer days.

STUDY NUMBER 15

ANALYSIS OF CO-VARIANCE OF CHANGE ON OUTCOME MEASURES BY EXPERIMENTAL AND CONTROL STUDENTS

PURPOSE OF STUDY

To determine if the treatment (Interpersonal Skills Training for Teachers) would translate to differences in student outcomes on mental health and cognitive indices, this study posed the following question:

> Can significant differences be detected between Change Means of grade-level groups of control and experimental students on indexes of mental health and cognition when raw change is adjusted for pre-test standing and student IQ?

DESIGN

Sample

The three samples for this study consisted of the students in each year 01, 02, and 03 who (1) had been taught by participating teachers and (2) had taken pre and post-tests of student outcome measures. For secondary students, "taught by participating teachers" was defined as having received instruction in two or more of their courses by teachers who met the inclusion criteria for Study 10. (Cf. ante.) For elementary students, "taught by participating teachers" meant that their classroom teacher was a teacher who met the inclusion criteria for Study 10.

In Year 02, the study was limited to those students who had been taught by participating teachers for both Years 01 and 02. Thus, no 1st grade students were included in the Year 02 analyses. The N for the Control 10th grade was severely reduced in Year 02 as only part of its 10th grade originated in the Control Junior High. The bottom two lines of Tables 62, 63, and 64 display the N by grade level within treatment groups for each year.

Table 62: Significance Levels Less Than .05 Detected Between Treatment Means of Adjusted Change on 12 Outcome Measures for Year 01 Students

Dependent Variable	Elementary						Sr. Hi.		
	1	2	3	4	5	6	10	11	12
HISM: Teacher-School	X	X	--	--	--	--	--	--	--
HISM: Physical Appearance	X	X	--	--	--	--	--	--	--
HISM: Interpersonal Adequacy	X	X	--	--	.017*	--	--	--	--
HISM: Autonomy	X	X	--	--	--	--	--	--	--
HISM: Academic Adequacy	X	X	.039*	--	.017*	--	--	--	.024
Total Days Absent	--	--	--	--	--	.001	.005*	--	--
Reading Vocabulary	--	--	--	--	--	X	.039	--	--
Reading Comprehension	--	--	--	--	--	X	.002	--	--
Language Usage	X	X	--	--	--	X	.001	--	--
Language Mechanics	X	X	X	X	--	X	.001	.002*	.018*
Math Computation	X	X	--	--	--	X	--	--	--
Math Concepts	X	X	--	--	--	X	.011	--	--
Experimental N+	231	242	209	232	258	257	299	264	207
Control N+	211	246	242	260	274	228	263	196	196

*Experimental group (students of NCHE trained teachers) achieved largest gain.
X = No data available at this level for this test.

+Study also included 1,481 Junior High students (872 Control and 609 Experimental) for whom data is not reported. See discussion.

Table 63: Significance Levels Less Than .05 Detected Between Treatment Means of Adjusted Change on 12 Outcome Measures for Year 02 Students

Dependent Variable	Elementary						Sr. Hi.		
	1	2	3	4	5	6	10	11	12
HISM: Teacher-School	NT	X	--	.046*	.014	.001*	--	--	--
HISM: Physical Appearance	NT	X	--	--	.026*	.005*	--	--	--
HISM: Interpersonal Adequacy	NT	X	--	--	.022	001*	--	--	--
HISM: Autonomy	NT	X	--	--	.035*	--	--	--	.001
HISM: Academic Adequacy	NT	X	--	--	--	.001*	--	.047*	--
Total Days Absent	NT	.048*	--	--	.043*	.003*	--	.032*	--
Reading Vocabulary		.003*	--	.038	--	--	--	--	.048*
Reading Comprehension	NT	.001*	--	.016	--	--	--	--	--
Language Usage	NT	X	--	--	--	.002*	--	--	.039*
Language Mechanics	NT	X	X	--	.001*	--	.010	.003	--
Math Computation	NT	X	--	--	.001*	.047*	.001	--	--
Math Concepts	NT	X	--	.039*	.030*	.00[illegible]	.001	.007	--
Experimental N	0	102	129	106	150	119	99	232	198
Control N	0	207	373	183	141	218	251	200	147

NT - No test run as no first grade student had been in program during previous year.

* Experimental group (students of NCHE trained teachers) achieved largest gain.

X No data available at this level for this test.

Table 64: Significance Levels Less Than .05 Detected Between Treatment Means of Adjusted Change on 11 Outcome Measures for Year 03 Students

Dependent Variable	Elementary						Jr. Hi.		Senior High			
	1	2	3	4	5	6	7	8	9	10	11	12
HISM: Teacher-School	X	X	--	--	--	--	--	--	--	--	--	--
HISM: Physical Appearance	X	X	--	.034*	--	--	.042*	.016*	--	--	--	--
HISM: Interpersonal Adequacy	X	X	--	--	--	--	--	.015*	--	--	--	--
HISM: Autonomy	X	X	.021*	.003*	--	--	--	.035*	--	.042*	--	--
HISM: Academic Adequacy	X	X	.017	--	--	--	.049	.018*	--	--	--	--
Reading Vocabulary	.045*	.049*	--	--	--	--	.044*	--	--	--	--	--
Reading Comprehension	.039*	--	--	--	.046*	--	--	--	--	--	.031	.022
Language Usage	X	X	X	--	.046*	--	.001*	--	0.011*	--	--	--
Language Mechanics	X	X	X	X	--	--	--	.031*	--	--	--	--
Math Computation	X	X	--	.049	.046*	--	.007	--	0.015*	--	.004*	--
Math Corcepts	X	X	--	--	.003*	--	--	--	--	.038*	--	.016
Experimental N	119	71	114	132	157	179	121	151	22	32	33	30
Control N	132	102	46	77	70	65	74	116	73	86	70	66

*Experimental group (students of NCHE trained teachers) achieved largest gain.
X - No data available at this level for this test.

Data Collection

For Years 01 and 02, the dependent variables were change from pre to post test measures[26] on Metropolitan Achievement Tests (for students in grades 1-6), California Achievement Tests (for students in grades 7-12), How I See Myself Tests (for students in grades 3-12), and total days absent for the year (for all students). For Year 03, the dependent variables were change from pre to post test measures on Metropolitan Achievement Tests(for students in grades 1-12) and How I See Myself Tests (for students in grades 3-12). The tests were administered by the students' regular classroom teachers according to the schedule in Table 7 and were scored by the test publishers. Absence data was not collected in Year 03 as the replication site school system did not have a central data processing unit so the data would have had to be manually processed from individual teacher's attendance registers for each month by individual student name for the 2,138 students.

ANALYSIS

The procedure used in this study was Analysis of Co-Variance of treatment means with pre-test score and student I.Q. score as the concomitant variables. The analyses were conducted separately for each appropriate variable for each grade-level 1-12. There were two treatment conditions: Experimental (students of teachers who had received Interpersonal Skills training) and Control (students of teachers who had not received Interpersonal Skills Training). In Year 02, the analysis was restricted to students of teachers who had remained in the same treatment group for both Year 01 and Year 02.

RESULTS

Tables 62, 63, and 64 display the results of the analyses for Years 01, 02, and 03, respectively. They are discussed separately below.

From Year 01

Of the 82 Analyses of Co-Variance whose results are displayed in Table 62 for Year 01, only 13 analyses yielded significant differences between the treatment means. Of these 13 significant

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[26] Except for (1) 1st grade where absolute post-test scores were used as no pre-test data was available and (2) for absenteeism where Total Days Absent for year was the dependent variable.

analyses, 7 were in favor of the control group and 6 were in favor of the experimental group.[27] Of the four significant differences in grades 1-6, three were in favor of the Experimental group. Six of the 9 significant differences in grades 10-12 were in favor of the Control group.

In addition to the 82 analyses for grades 1-6 and grades 10-12 whose results are displayed in Table 62, 33 analyses were conducted for grades 7-9. The data from these analyses is not reported because:

1. Thirteen of seventeen significant analyses were in favor of the experimental group -- a pattern which is widely discrepant from that in the other grades.

2. The researchers had knowledge of matters internal to the Control school which made it seem highly probable that the results yielded in the analyses were an effect of that school and not of the training.

3. The results could not be validated in Year 02 because the Control School withdrew from the study as <u>one</u> of the consequences of the matters internal to the school mentioned in 2 above.

<u>From Year 02</u>

Of the 88 Analyses of Co-Variance whose results are reported in Table 63 for Year 02, thirty-two analyses yielded significant differences between treatment means. Of these 32 analyses, 22 were in favor of the experimental group. Of the 23 significant analyses in grades 1-6, the Experimental group had the mean associated with desired change for 18 variables. At the secondary level, only four of the 10 significant analyses were in favor of the experimental group.

When these totals are broken down by kind of index, the Experimental grades 1-6 had means associated with desired change for 7 of 9 significant analyses on Self-Concept factors, 3 of 3 significant analyses for Total Days Absent and 8 of 11 significant analyses for Achievement Tests. In grades 10-12, on the other hand, the Experimental groups had analyses in their favor for 1 out of 1 significant analyses on Total Days Absent, and 2 of 7 significant analyses on Achievement Tests.

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[27] "In favor of" signifies that the group indicated had the <u>greatest</u> amount of gain on Cognitive or Self-Concept tests or the <u>fewest</u> days absent.

Breaking the significant analyses down by grade levels, the experimental group achieved 3 of 3 at second grade, none of none at third grade, 2 of 4 for fourth grade, 6 of 8 for fifth grade, 7 of 8 for sixth grade, 0 of 3 for tenth grade, 2 of 4 for eleventh grade, and 2 of 3 for twelfth grade groups. Among the elementary grades (2-6), grades three and four seem to be atypical.

From Year 03

Of the 111 Analyses of Co-Variance whose results are reported in Table 64 for Year 03, 30 analyses yielded significant differences between treatment means. Of these 30 analyses, 23 were in favor of the Experimental group. Of the 12 significant analyses in grades 1-6, Experimental groups had the mean associated with desired change for 10 variables. For grades 7-9, 10 of the 12 significant analyses were in favor of the experimental groups. For grades 10-12, three of 6 significant analyses were in favor of the Experimental groups.

When these totals are broken down by kind of index, Experimental grades 1-6 had means associated with desired change for 3 of 4 significant analyses on Self-Concept factors, and 7 of 8 significant analyses for Achievement Tests. For grades 7-9, the Experimental groups had means associated with desired change for 5 out of 6 significant analyses for Achievement Tests. For grades 10-12, the Experimental groups had analyses in their favor for 1 of 1 significant analyses on Self-Concept Factors, and 2 of 5 significant analyses on Achievement Tests.

Breaking the significant analyses down by grade levels, the Experimental group achieved 2 of 2 first grade level, 1 of 1 at second grade level, 1 of 2 at third grade level, 2 of 3 at fourth grade level, 4 of 4 at fifth grade level, none of none at sixth grade level, 3 of 5 for seventh grades, 5 of 5 for eighth grades, 2 of 2 for ninth grades, 2 of 2 for tenth grades, 1 of 2 for eleventh grades, and none of 2 for twelfth grades. The sixth grade seemed to be atypical.

DISCUSSION

The results displayed in Tables 62, 63, and 64 are summarized in Table 65. As evident in this summary table, the effect of the Interpersonal Skills Training for teachers was not translated to student benefits in Year 01 but was so translated for Years 02 and 03.

The data concerning significant analyses summarized in Table 65 is converted into percentages in Table 66. The percentages for Year 01 represent only 13 significant analyses out of 82 analyses conducted.

The pattern presented is one of growing effectiveness in translating the benefits from Teacher Training to Student Outcomes. The differences seem to be cumulative -- that is, the Year 02 Experimental students whose teachers had been in the program for both years did much better than they did in Year 01 as compared to the Control students. This is especially interesting when compared to the training the teachers received in the two years.

In Year 01, training focused on Interpersonal Skills per se while in Year 02 training focused on helping teachers apply their increased levels of Interpersonal Skills to "learning" interactions in the classroom rather than just to the more "personal" interchange. (See Study 10, cf. ante.) Since the "personal" interchanges in the classroom setting are (for most classes) a minor proportion of the interactions occurring, it may well be that few benefits were derived by the Experimental students from the Year 01 training of their teachers simply because the skills were only infrequently exercised in the classroom. When the teachers learned to apply their interpersonal skills to "learning" contexts, the students began to derive benefits from them. This hypothesis is somewhat supported by the results from Year 03 in which the training was combined into a one-year program incorporating both interpersonal skills training and training in applying those skills in the learning contexts.

Further support for this hypothesis is supplied by comparing the percentages of significant analyses in the experimental groups favor by kind of Index for the two years. (See Table 66). Thus in Year 01, most of the few significances that occurred were in the Mental Health Indices (Self-Concept and Total Days Absent) which are more "personal" than are the Achievement Indices. (However, it must be kept in mind that these percentages only represent 13 significant analyses). In Year 02, the significant analyses are more evenly split between mental health and cognitive indices.

In Year 03, when the two kinds of training were combined into a one-year program (with sixteen hours of training as opposed to 12 hours for Year 02 and 15 hours for Year 01) the significant differences are again divided between Self-Concept and Achievement Test indices. Further, the cumulative nature of the effects on students seem to be further supported by the fact that while Year 03 had proportionately fewer significant analyses than did Year 02, the percentage of these significant analyses which were in favor of Experimental

Table 65: Summary of Tables 62, 63, and 64

Tests	Grades	Class	Year 01	Year 02	Year 03
All Indices	All Grades	Total Number of Analyses	82		111
		Number of Significant Analyses	13	33	30
		N of Sig. Analyses in Favor Exp.	6	22	23
	Grades 1-6	Total Number of Analyses	46	50	45
		Number of Significant Analyses	4	23	12
		N of Sig. Analyses in Favor Exp.	3	18	10
	Grades 7-9	Total Number of Analyses	--	--	33
		Number of Significant Analyses	--	--	12
		N of Sig. Analyses in Favor Exp.	--	--	10
	Grades 10-12	Total Number of Analyses	36	36	33
		Number of Significant Analyses	9	10	6
		N of Sig. Analyses in Favor Exp.	3	4	3
Self-Concept	Grades 1-6	Total Number of Analyses	20	20	20
		Number of Significant Analyses	3	9	4
		N of Sig. Analyses in Favor Exp.	3	7	3
	Grades 7-9	Total Number of Analyses	--	--	15
		Number of Significant Analyses	--	--	6
		N of Sig. Analyses in Favor Exp.	--	--	5
	Grades 10-12	Total Number of Analyses	15	15	15
		Number of Significant Analyses	1	2	1
		N of Sig. Analyses in Favor Exp.	0	1	1
Total Days Absent	Grades 1-6	Total Number of Analyses	6	5	--
		Number of Significant Analyses	1	3	--
		N of Sig. Analyses in Favor Exp.	0	3	--
	Grades 7-9	Total Number of Analyses	--	--	--
		Number of Significant Analyses	--	--	--
		N of Sig. Analyses in Favor Exp.	--	--	--
	Grades 10-12	Total Number of Analyses	3	3	--
		Number of Significant Analyses	1	1	--
		N of Sig. Analyses in Favor Exp.	1	1	--
Achievement Tests	Grades 1-6	Total Number of Analyses	20	25	25
		Number of Significant Analyses	0	11	8
		N of Sig. Analyses in Favor Exp.	0	8	7
	Grades 7-9	Total Number of Analyses	--	--	18
		Number of Significant Analyses	--	--	6
		N of Sig. Analyses in Favor Exp.	--	--	5
	Grades 10-12	Total Number of Analyses	18	18	18
		Number of Significant Analyses	7	7	5
		N of Sig. Analyses in Favor Exp.	2	2	2

-- No data available for this level on this index.

Table 66: Percent of Significant Analyses in Favor of Experimental Group

Index	Group	Year 01	Year 02	Year 03
All Indices	All Grades	46%	66%	76%
	Grades 1-6	75	78	83
	Grades 7-9	--	--	83
	Grades 10-12	33	40	50
Self-Concept Tests	All Grades	75%	72%	71%
	Grades 1-6	100	77	75
	Grades 7-9	--	--	83
	Grades 10-12	0	50	100
Total Days Absent	All Grades	50%	100%	--
	Grades 1-6	0	100	--
	Grades 7-9	--	--	--
	Grades 10-12	100	100	--
Achievement Tests	All Grades	28%	55%	73%
	Grades 1-6	X	72	87
	Grades 7-9	--	--	83
	Grades 10-12	28	28	40

X = No analysis at this level for this index reached .05 significance.

-- No data available for this level on this index.

groups was higher than in Year 02. Thus, if the students were to be followed for a second year in the replication site, it would be anticipated that the incidence of significant differences detected would be increased.

The distribution among the different school levels of the significant differences reflected the differences detected in response to training of teachers at the different levels.[28] Thus elementary Experimental students (grades 1-6) did better (compared to the Control students) than did the secondary students (grades 10-12) for all three years. Data for only one year was available for grades 7-9 but for that year, they did as well as the elementary students.

The few significant differences (split between control and experimental groups) at the third and fourth grades reflect the lower R-squares in those grades for prediction of student achievement (from teacher behavior) which were registered in the analyses conducted in Study No. 14. (Cf. ante.) Patterns of significant differences at other grade levels in this study also reflect other results of Study No. 14 but not in a one-to-one correspondence.

The data for Total Days Absent was most interesting to the researchers. Of the six significant differences detected between the treatment groups for absenteeism in Years 01 and 02, five of them were in favor of Experimental groups. (The one that was not was for the sixth grade in Year 01 and was the only difference detected between the sixth grade treatment groups in that year). This would seem to support the finding of Study No. 14 that when the teachers are using higher levels of interpersonal skills, students miss fewer days of school during the year.

Tables 67 and 68 display the Adjusted Treatment Means for the analyses in Year 02 and Year 03 in which significant differences were detected. Examination of these tables supports the conclusion that not only are the differences detected statistically significant but they are also meaningful in the "real-world"; i.e., they are not trivial. For example, differences between treatment means for grade-level groups of two to four days additional absence a year is a significant proportion of the 176-day school year. A further indication of the meaningful nature of these detected differences is that in the

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[28] See Study No. 10 (cf. ante.) in which Elementary Teachers made greater gains in Interpersonal Skills than did Secondary Teachers.

Table 67: Adjusted Treatment Means for Variables and Grade Levels in which Significant Differences ($p < .05$) were Detected in Year 02 Student Data

Dependent Variables	Grade 1		Grade 2		Grade 3	
	Exp.	Con.	Exp.	Con.	Exp.	Con.
Total Days Absent	NT	NT	8.04	10.24	NS	NS
Reading Vocabulary	NT	NT	8.42	7.89	NS	NS
Reading Comprehension	NT	NT	13.15	9.66	NS	NS
	Grade 4		Grade 5		Grade 6	
	Exp.	Con.	Exp.	Con.	Exp.	Con.
HISM: Teacher-School	0.21	-0.71	-0.94	2.84	2.39	-0.32
HISM: Physical Appearance	NS	NS	0.88	-2.63	1.12	0.04
HISM: Interpersonal Adequacy	NS	NS	0.54	3.88	4.20	0.52
HISM: Autonomy	NS	NS	0.40	-2.00	NS	NS
HISM: Academic Adequacy	NS	NS	NS	NS	0.04	-0.82
Total Days Absent	NS	NS	4.72	8.01	8.29	4.61
Reading Vocabulary	3.32	5.08	NS	NS	NS	NS
Reading Comprehension	-5.54	-8.21	NS	NS	NS	NS
Language Usage	NS	NS	NS	NS	12.96	6.93
Language Mechanics	NS	NS	4.84	-4.38	NS	NS
Math Computation	NS	NS	-5.70	-10.48	6.47	3.78
Math Concepts	-1.39	-4.16	-4.16	-7.50	3.71	7.93
	Grade 10		Grade 11		Grade 12	
	Exp.	Con.	Exp.	Con.	Exp.	Con.
HISM: Autonomy	NS	NS	NS	NS	-0.19	1.16
HISM: Academic Adequacy	NS	NS	0.91	0.21	NS	NS
Total Days Absent	NS	NS	9.11	12.64	NS	NS
Reading Vocabulary	NS	NS	NS	NS	8.92	4.22
Language Usage	NS	NS	NS	NS	1.96	0.78
Language Mechanics	4.45	6.58	0.90	3.79	NS	NS
Math Computation	-4.22	-2.76	NS	NS	NS	NS
Math Concepts	-6.35	-3.79	0.15	1.51	NS	NS

NT = No Test.

NS = Not Significant.

Table 68: Adjusted Treatment Means for Variables and Grade Levels in which Significant Differences ($p < .05$) were Detected in Year 03 Student Data

Dependent Variables	Grade 1		Grade 2		Grade 3	
	Exp.	Con.	Exp.	Con.	Exp.	Con.
HISM: Autonomy	NT	NT	NT	NT	0.99	-1.97
HISM: Academic Adequacy	NT	NT	NT	NT	-0.19	0.94
Reading Vocabulary	4.46	2.28	5.50	2.46	NS	NS
Reading Comprehension	3.70	1.96	NS	NS	NS	NS
	Grade 4		Grade 5		Grade 6	
	Exp.	Con.	Exp.	Con.	Exp.	Con.
HISM: Physical Appearance	1.75	0.04	NS	NS	NS	NS
HISM: Autonomy	0.91	-0.22	NS	NS	NS	NS
Reading Comprehension	NS	NS	4.83	2.13	NS	NS
Language Usage	NS	NS	-17.04	-23.40	NS	NS
Math Computation	5.69	7.19	-10.01	-13.52	NS	NS
Math Concepts	NS	NS	-5.78	-9.30	NS	NS
	Grade 7		Grade 8		Grade 9	
	Exp.	Con.	Exp.	Con.	Exp.	Con.
HISM: Physical Appearance	1.21	-0.14	1.41	0.14	NS	NS
HISM: Interpersonal Adequacy	NS	NS	1.98	-0.18	NS	NS
HISM: Autonomy	NS	NS	1.97	0.26	NS	NS
HISM: Academic Adequacy	0.48	0.95	0.56	-0.20	NS	NS
Reading Vocabulary	-6.44	-8.40	NS	NS	NS	NS
Language Usage	1.61	-6.22	NS	NS	0.24	-3.46
Language Mechanics	NS	NS	1.89	0.71	NS	NS
Math Computation	-4.89	-7.62	NS	NS	-11.69	-13.02
	Grade 10		Grade 11		Grade 12	
	Exp.	Con.	Exp.	Con.	Exp.	Con.
HISM: Autonomy	1.78	-0.31	NS	NS	NS	NS
Reading Comprehension	NS	NS	-2.15	0.12	-0.74	1.36
Math Computation	NS	NS	2.45	0.18	NS	NS
Math Concepts	1.94	0.24	NS	NS	-2.32	1.11

NT = No Test NS = Not Significant

25 significant analyses for Self-Concept factors, 11 of the favorable gains registered by the Experimental groups were reversals of negative change (as indicated by the sign of the change on the Control group mean). For the 37 analyses in which significant differences were detected among Achievement test variables, 16 of the favorable gains registered by the Experimental groups were reversals or mitigations of negative change (as indicated by the sign of the change on the Control group mean).

SUMMARY

In conclusion, findings from this study were:

1. The Effects of Interpersonal Skills Training for teachers was translated to student benefits in Years 02 and 03.

2. The student benefits seem to be cumulative; that is, students did better in the second year of the program than in the first year.

3. The differences between the treatment means (Change on student outcome indices) reflected the differences in the skills training which their teachers received.

4. The distribution among grade levels of significant differences in favor of Experimental groups reflected the differential response to Interpersonal Skills Training of elementary and secondary teachers.

5. The significant differences detected between the treatment groups on the Absenteeism variable support the finding of Study 14 that when teachers are using higher levels of interpersonal skills, students miss fewer days of school during the year.

6. The differences detected between Treatment means in Years 02 and 03 were not only statistically significant but were also meaningful in the real world.

PART IV

SUMMARY AND IMPLICATIONS FOR PRACTICE AND RESEARCH

SUMMARY AND IMPLICATIONS FOR PRACTICE AND RESEARCH

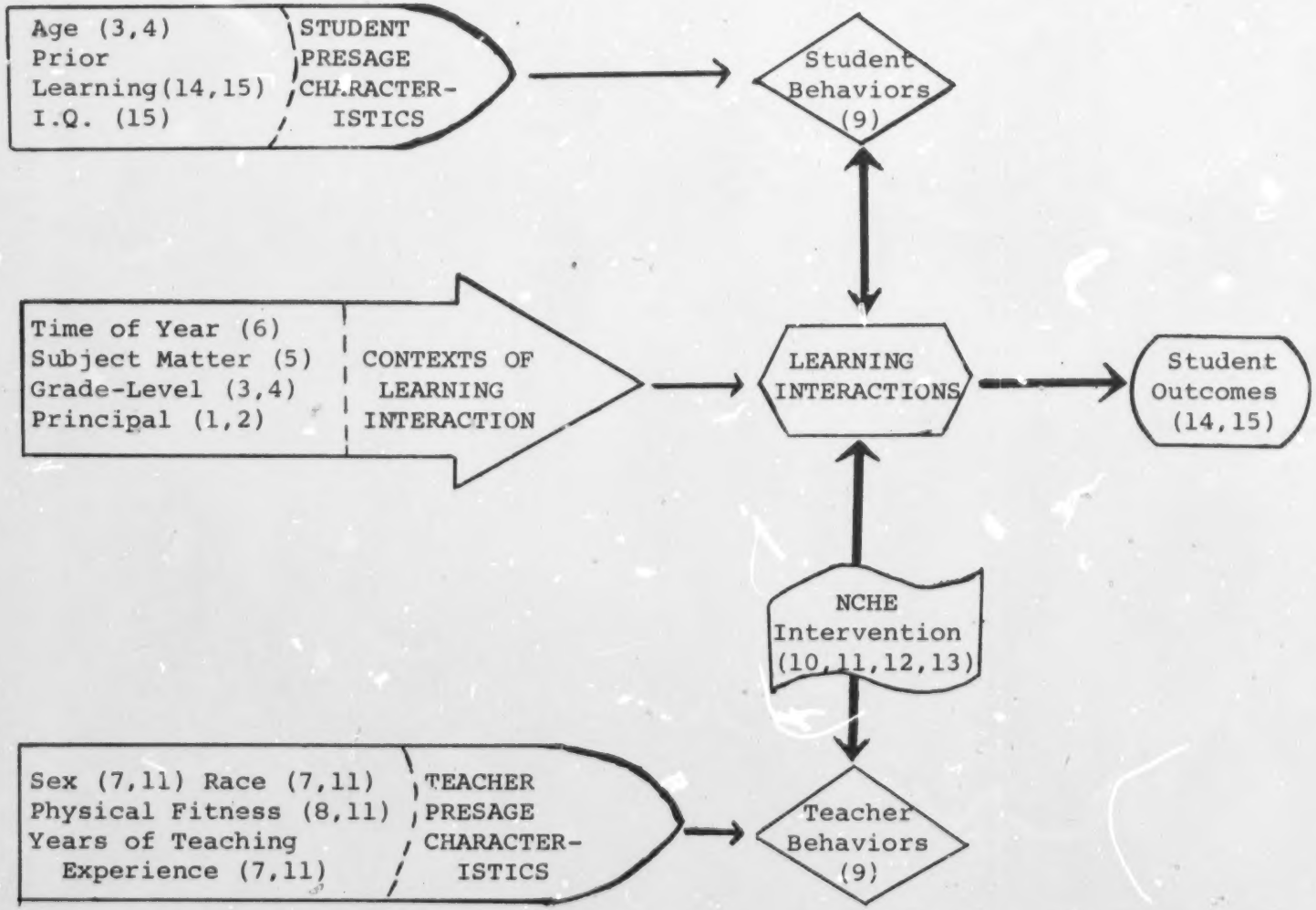
Over a period of three years, the National Consortium for Humanizing Education worked with teachers and students in two states to test hypotheses drawn from a model in which student outcomes (including good mental health) are seen as the results of a learning process occurring between individuals rather than as the product of an institutionalized situation. In this model, mental health is assumed to be learned in much the same way that other capabilities are learned; that is, as the result of an interdependent interpersonal interactive process. Although the learning context of concern in the present study was that within the institution of the school, neither the teacher nor the students leave their emotions and their awareness of themselves as individuals at the door when they enter the schoolroom; therefore the learning process taking place inside the room can not divorce "human interaction" from "knowing" or "growing."

Model Tested

The specific elements of the model to be considered in these studies were drawn from the definition of learning as an "interdependent interpersonal interactive process." The elements of the model included (1) presage characteristics of the teachers and students, (2) contexts of the learning interaction, (3) teacher and student behavior within the learning interaction process, and (4) student outcomes from the process. The major hypothesis to be tested was that intervention (Interpersonal Skills Training) to change the quality of the teacher's input to learning interactions would result in benefits to students.

Illustration 2 displays the complete model for the studies. The number beside each of the listed variables are the numbers of the individual studies (as presented in Parts II and III of this report) in which the variable was considered as a major item in the analysis. The results from the 15 individual studies will be presented below and discussed as they are related to the elements of the model. As the results are presented, the number of the study from which the findings resulted will be referenced.

Illustration 2: Model Tested with Individual Study Numbers Indicated for Variables Considered



INTEGRATION OF RESEARCH FINDINGS

Student Presage Characteristics

Age: Age was only considered indirectly under the rubric of grade-level, since there is an almost one-to-one correspondence between age and grade-level when large numbers of students in all grades 1-12 are considered. For findings related to age, see the discussion of grade-level below.

I. Q. and Prior Learning: I. Q. and Prior Learning (pre-test scores) of students were considered as concomitant variables in study 15, in which they were used to adjust the dependent variables of change on student outcomes for entering levels of differences. In Study 15, the regression coefficient for I.Q. was significant at levels less than .05 for 21% of the analyses in which change on a How I See Myself factor was the dependent variable, for 95% of the analyses in which change on an Achievement Test was the dependent variable, and for 70% of the analyses in which Total Days Absent for the year was the dependent variable. The regression coefficient for Pre-test was significant in 94% of the HISM analyses, and 86% of the Achievement Test Analyses.

The most interesting of these findings is the negative correlation between I.Q. and Total Days Absent for the year. It stimulates a question which was not answered by these analyses; that is, "Do students with higher I.Q. come to school more often because it is a more pleasant place for them than for students with lower learning abilities and/or achievement?"

Teacher Presage Characteristics

Studies 7 and 8 considered the relationships between (1) sex, (2) race, (3) years of teaching experience and (4) physical fitness (level of physical functioning as measured on the Harvard Step Test) and the Classroom Functioning Variables* (teacher and student behaviors within the learning interaction process.) Sex of the teacher was found to be the most important contributor to the variation of Classroom Functioning with Years of Teaching Experience also having a slight effect. Race of the teacher did not seem to be an important contributor to the variation of classroom processes. (Study 7). A small but non-chance relationship was discovered between the teacher's level of physical functioning and the Classroom Functioning variables. (Study 8). Additional specific findings from Study Number 7 included:

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*For names of variables, see Table 69, page 194.

1. Sex contributions to the variation of G (Genuineness of the teacher), SP (Success Promotion), and C-8, Student Asks for Thinking) seemed to be clear-cut, with male teachers functioning at higher levels than female teachers.

2. Sex contributions to the variation of F-5, F-8, F-9, C-1, C-5, and C-6 may have been contaminated by grade-level differences. However, the significant differences detected for these variables in the present study indicated that male teachers lectured more (F-5), allowed or elicited more student initiated responses (F-9), were asked more fact questions (C-6) by their students, and spent less time presenting facts (C-1) to their students, while female teachers elicited more directed student response (F-8) and more use of facts by students (C-5).

3. Teaching experience showed as a significant factor in four variables; as a main effect for variables F-3 and F-6 and in interactions for variables C-8 and G. The information provided by these analyses seemed to be that teachers beginning their first year of teaching were different from other teachers in that they gave more directions (F-6) and accepted more student ideas (F-3).

All four of these variables were again considered in Study Number 11 in which the effects of teacher characteristics on response to training were analyzed. The teacher's level of physical functioning was used as a co-variate to adjust for individual differences. In the 25 analyses conducted, the regression coefficient of physical functioning was not significant at the .05 level for any analysis. There was no systematic differential response to Interpersonal Skills training by sub-groups of teachers differentiated according to teacher characteristics of race, sex, or years of teaching experience. (Study Number 11).

Although there were some slight differences (by teacher characteristics of sex, years of teaching experience, and physical functioning) on entering training, the training seemed to be equally received by all sub-groups and the slight entering differences were "washed out" during training.

Context of Learning Interaction

The context variables of (1) Time of Year, (2) Subject Matter, (3) Grade-Level on which the teacher instructs, and (4) the Principal's levels of functioning were considered separately in studies 1-6 to determine their relationships

with the Classroom Functioning variables (teacher and student behavior within learning interactions). Of the four variables, only Subject Matter was not found to have an important effect on the Classroom Functioning variables. The findings related to each of the context variables are presented separately below.

Subject Matter: The subject matter presented by the teacher was a significant source of variation for only two variables (C-3: Teacher Thinks and C-6: Student Asks for Facts) out of 25 variables analyzed. For both variables, Math teachers attained the highest mean. For C-6, Science teachers scored a mean slightly lower than, but not different from, that of the Math teachers. (Study Number 5).

Grade Level: The grade-level at which the teacher instructs was found to have a significant effect on the variation of both the Flanders' Categories and the Cognitive Functioning Categories but not on the Process Scales. Significant differences among the grade level means of Flanders' and Cognitive Categories were detected for all categories except F-1 (Teacher Accepts Feelings); C-4 (Teacher Asks for Thinking), C-7 (Student Thinks), and C-9 (Non-Cognitive Behavior in the classroom). The sources of these grade-level differences were primarily a result of differences between the means of (1) one or more of the elementary grades and (2) one or more of the levels of the secondary schools. Few significant sources of variation were found between the two levels of secondary schools (7-9 and 10-12) or among the elementary grades 1-6. (Studies 3 and 4). The pattern of predictive interrelationships of all Classroom Functioning variables, as well as the relative quantity of each variable, was also different at the elementary and secondary levels. (Study 6).

The question stimulated by these studies has to do with the causative origin of the grade-level differences detected. Are they a function of students' ages, differential school curriculum and organization at the elementary and secondary levels, differential expectation of teachers, or an interaction of two or more of these factors?

Time of Year: Significant trends across time were found in the Control group data. These trends were consistent with the interpretation that there is a deterioration across the year from September till May in the levels of facilitative conditions offered students by their teachers. These trends were also present in the Experimental group data but were mitigated by the effects of the training in Interpersonal Skills which the experimental teachers had received. (Study Number 6).

Principal's Level of Functioning: Both Studies 1 and 2 dealt with the effect of the principal on learning interactions. In Study Number 2, teachers were grouped according to their

principal's level of interpersonal functioning. Then their reports of working environment and instructional tasks (on the Semantic Differential instrument displayed in the Appendix) were analyzed for significant differences. Significant differences were found among the groups of teachers with the teachers of high functioning principals tending to find their working environment and instructional tasks more attractive than the teachers of low functioning principals.

In Study Number 1, the principal's functioning in Teacher/Principal interactions (analagous to the Student/Teacher interactions measured on the Classroom Functioning Variables) were analyzed for relationships with the Classroom Functioning variables. Specific findings from this study were:

1. Significant ($p < .05$) predictive relationships between the principal's interpersonal behavior and the teacher's classroom behavior were detected for 19 of 25 dependent variables.

2. Five of the 19 significant models accounted for meaningful amounts of variation with $RSQ > .20$ in each case.

3. The best predictors of the teacher's behavior were identified as the principal's (a) level of Respect for the teacher, (b) use of Praise, (c) Acceptance of Ideas, and (d) Asking of Fact Questions.

In conclusion, it seemed that as a principal used higher levels of interpersonal and interactional skills with his teachers, they used higher levels of these skills with their students.

The findings relative to each of the four context variables are important in and of themselves. But, together, they have strong implications for the planning of educational research. They pretty well rule out the validity of cross-sectional, one-slice-of-the-research-pie studies unless those studies are carefully planned and controlled for the effects of the context variables operative on the dependent variables of concern in the research to be undertaken.

Inter-relationships of Teacher and Student Behavior within Learning Interactions

Study Number 9 generated 300 Response Surfaces through a backward elimination multilinear regression analysis technique using quadratic terms. These Response Surfaces

specified the inter-relationships of teacher and student behavior within learning interactions. Specific findings from this study included:

1. Replicable, predictable, and significant relationships were detected among variables of teacher and student classroom functioning.

2. These relationships were different at the secondary and elementary levels.

3. Specific recurring predictors for each of the study variables were identified.

4. Some of the classroom functioning variables co-varied significantly and frequently with a large number of the other study variables, and these predictors were few enough in number to suggest that efficient programs for changing overall classroom functioning could be developed by focusing training efforts on these few highly predictive variables.

5. The individual response surfaces generated for each study variable provided specific suggestions for focusing training efforts aimed at changing selected aspects of teacher or student behavior.

6. Two of the 4 most frequently recurring predictors (and 3 of the top 10) were variables which had been postulated by Rogers as being positively related to effective learning environments.

7. Most of the frequently recurring predictors were related to the kinds of behavior classified by Flanders as "Indirect."

8. The kinds of behavior hypothesized by the National Consortium for Humanizing Education as characterizing a humane classroom were also the kinds of behavior which were frequently recurring predictors of the other study variables.

9. The curvilinear relationships detected were strong enough and constant enough to suggest that educational researchers need to emphasize the building and testing of at least quadratic models.

The general picture presented was that of increased student participation and higher levels of student thinking when teacher behaviors were characterized as (1) indirect, (2) offering high

levels of facilitative conditions to students, and (3) expecting students to perform at high levels.

NCHE Intervention

The intervention (treatment applied) by the National Consortium for Humanizing Education was Interpersonal Skills Training for Teachers. Studies Number 10, 11, 12, and 13 tested the efficacy of the training and Study Number 6 provided additional information as to the nature of the process occurring as a result of training.

Over-all Effectiveness: Findings related to the over-all effectiveness of the training included:

1. Significant differences were detected between control and experimental groups for all three years of the study. (Study Number 10).

2. Elementary teachers responded better to the training than Secondary teachers. (Study Number 10).

3. The changes achieved by Experimental groups (teachers receiving Interpersonal Skills Training) were of magnitudes large enough to be both statistically significant and not trivial; i.e., they were meaningful in the real-world. (Study Number 10).

4. The 97 significant trends across time detected in the Experimental teacher data was compatible with the interpretation that treatment benefits were in directions opposed to the direction of "normal" deteriorative processes evidenced across the school year in the Control group data. (Study Number 6).

5. The variables on which movement occurred were directly and positively related to the specific content of the training program and varied when the content varied. (Studies 10 and 12).

6. The major effect of the training was a change in the quality of the interactions between student and teacher with a smaller but supporting change in the proportions of teacher/student participation in classroom verbal interchanges. (Study Number 10).

7. The training was equally effective with sub-groups of teachers differentiated according to teacher

characteristics of race, sex, or years of teaching experience. (Study Number 11).

Table 51 ("Magnitude of Change in Experimental Teacher Behavior") in Study 10 compared the gains made by the Experimental teachers with their pre-test (entering training) levels of functioning. Another way to examine the meaningfulness of the gains made by the Experimental teachers is to compare their exiting levels with the normative data derived from the Control groups over the three year period as displayed in Table 69. (Exiting level can be computed from Table 51 by adding the Change means to the Pre-test means).

Comparing the exiting levels of the Experimental teachers to the data in Table 69 for Flanders' Interaction Analysis Categories shows that (on exit from training) the Experimental elementary teachers (grades 1-6) were using almost 4 times as much acceptance of student feelings as the norm for the Control teachers, two and a half times as much praise and encouragement, almost three times as much acceptance of student ideas, asked about a tenth more questions, and lectured about a tenth less. Their students spent about 15% more time in the Student Responds Category and almost twice as much time in the Student Initiates Category as the students of the Control teachers and there was only half as much silence or confusion in the classrooms of the Experimental teachers. However, the Experimental teachers gave about the same amount of directions or commands as the Control teachers and used slightly more than twice as much criticism or justification of authority.

For Experimental secondary teachers, (grades 7-12) the picture was much the same. They used about three-fourths more praise or encouragement than the Control secondary teachers did, almost five times as much acceptance of student ideas, asked about three times as many questions, lectured about a twentieth less, used about a third more directions or commands and criticism or justification of authority. Their students spent about 25% more time in the Student Responds Category and about a tenth more time in the Student Initiates Category than the students of the Control Teachers and there was about 60% less silence or confusion in Experimental classrooms.

For the Cognitive Functioning Categories, the Experimental elementary teachers spent about a tenth less time recalling facts and asking students for facts and about three times as long in thinking and in asking students to think than did the Control Teachers. Experimental students spent about 20% more time recalling facts, about a fourth more time asking for facts, about a third more time thinking and about 15% less time asking for thinking than the students of the Control teachers. The Experimental teachers had about three

Table 69: Normative Data for Classroom Functioning Variables -- Means from 1,951 One-hour Audio Tape Recordings of Instruction Submitted by Control Teachers in Texas from May, 1971 to May, 1973 and in Louisiana from September, 1973 to April, 1974

Classroom Functioning Variable		Elementary Teachers $\bar{X}$	Secondary Teachers $\bar{X}$
F-1:	Teacher Accepts Feelings of Student	0.04	0.06
F-2:	Teacher Praises or Encourages Student	1.46	0.71
F-3:	Teacher Accepts Ideas of Student	0.74	0.41
F-4:	Teacher Asks Questions	21.77	6.94
F-5:	Teacher Lectures	82.83	113.33
F-6:	Teacher Gives Directions or Commands	8.49	3.49
F-7:	Teacher Criticizes or Justifies Authority	1.24	0.53
F-8:	Student Responds	74.65	60.13
F-9:	Student Initiates	11.69	14.07
F-10:	Silence or Confusion	36.91	31.48
C-1:	Teacher Recalls Facts	92.10	115.66
C-2:	Teacher Asks for Facts	21.31	14.26
C-3:	Teacher Thinks	0.10	0.50
C-4:	Teacher Asks for Thinking	1.21	1.37
C-5:	Student Recalls Facts	81.23	68.10
C-6:	Student Asks for Facts	1.01	2.43
C-7:	Student Thinks	2.51	3.62
C-8	Student Asks for Thinking	0.12	0.38
C-9:	Non-Cognitive Behavior	2.91	2.08
C-10:	Silence or Chaos	37.15	31.54
M:	Meaning	2.65	2.65
G:	Genuineness	2.65	2.66
SP:	Success Promotion	2.66	2.30
R:	Respect	2.70	2.71
SI:	Student Involvement	2.84	2.82
N of Teachers		153	91
N of Tapes		1,258	693

For Flanders' and Cognitive variables, data is reported as the total number of 3-second intervals coded in category during 12 minutes selected at random in four 3-minute segments from a 1-hour tape. For Process Scales, data is reported as mean level of functioning maintained during the four 3-minute segments.

times as much Non-Cognitive Behavior (primarily affect-related behaviors) in their classrooms as was registered in the classrooms of the Control teachers.

The Experimental secondary teachers spent about 5% less time recalling facts, about a fourth more time asking for facts, about half as much time thinking, and about a fourth more time asking for thinking from their students than was the norm for the Control teachers. The students of the Experimental secondary teachers spent about a fifth more time recalling facts, about a fifth less time asking for facts, about two and a half more time thinking, and about one and a half as much time asking for thinking as did the students of the Control teachers. The Experimental secondary teachers had about half again as much Non-Cognitive Behavior in their classrooms as did the Control teachers.

The Process Scales are characterized by the general effect on students of teachers operating at each level as:

1.0 Crippling
2.0 Hurting
3.0 Minimally Effective
4.0 Adding Significantly
5.0 Adding, Encouraging, Exploring[30]

The data displayed in Table 69 shows that the Control teachers had means in the upper half of level two. The exiting levels for the Experimental elementary teachers were 3.15 on Meaning, 3.12 on Genuineness, 3.10 on Success Promotion, 3.29 on Respect, and 3.40 on Student Involvement. For secondary Experimental teachers, the exiting levels were 3.03 for Meaning, 2.98 for Genuineness, 3.01 for Success Promotion, 3.03 for Respect, and 3.12 for Student Involvement. In every case except that of Genuineness for secondary teachers, the Experimental teachers made large enough gains to put them across the Minimally Effective threshold.

Relative Effectiveness of Different Versions of Training Program

The final Training Program* was the product of two research and development cycles. Analyses comparing the different versions yielded the following results:

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[30] Notation adopted from Carkhuff, R. R. The Art of Helping, Amherst, Massachusetts: Human Resource Development Press, 1973.

*For details, see Aspy, D. N., et al, Interpersonal Skills Training for Teachers: Interim Report #2. Monroe, LA: National Consortium for Humanizing Education, Northeast Louisiana University (National Institute of Mental Health Research Grant No. 5 PO 1 MH 19871), 1974.

1. The greatest gains were made by teachers who received two years of training (totaling 27 hours) with the first year focused on increasing levels of interpersonal skills and the second year focused on applying interpersonal skills to learning interactions as well as more personal exchanges. (Study Number 10).

2. The second largest gains were made by teachers who had one year of training (totaling 16 hours) which combined (in the one year program) training focused on increasing levels of interpersonal skills with training focused on applying these skills to learning interactions. These gains were not as large as the gains made over the total two years by the teachers who received the two year program but were greater then the gains made by those teachers in any single year. The one year combined program was more efficient than the two year program when gains are considered in terms of the total number of hours involved in the training. The training was applied by teams of Peer/Professional trainers with racial intermixes. (Study Number 10).

3. A pilot of the one-year combined program (described in 2 above) was compared with two versions of the one year program which focused on increasing levels of interpersonal skills. The two versions with which the combined program was compared were (1) the program applied in Year 01 of the two year program (described in 1 above) and (2) with revision of that Year 01 program which was applied to new experimental teachers in the second research year. No conclusion was drawn as to the relative effectiveness of the original and the revised version of the Year 01 program although there was some indication in the data that the revised version was slightly more effective. However, it was concluded that the combined program was more effective than either version of the Year 01 program. (Study Number 12).

4. A small N study was conducted to compare the relative effectiveness of the training when the principal of the school had received prior training in Interpersonal Skills and when he had not. The null hypothesis was rejected and the conclusion was that prior training of the principal enhances teacher response to Interpersonal Skills Training. (Study Number 13).

Student Outcomes

Two studies were concerned with the evaluation of Student Outcomes. Study Number 14 examined the predictive relationships between the Classroom Functioning variables and Student Outcomes to see whether or not the process variables were good predictors of student change (gain). Study Number 15 compared the change made by students of Experimental teachers with that made by students of Control teachers.

Specific findings from Study Number 14 included:

1. The Classroom Functioning variables are good predictors of student change when raw change is adjusted for pre-test standing.

2. When the teacher is functioning at high levels of acceptance and responsiveness to students, the students miss fewer days of school during the year.

3. At the upper grade levels, the teacher has a more direct effect on students' attainment of specific skills than on attainment of concepts or more abstract processes.

4. The Classroom Functioning variables were equally effective predictors for change on both Self-Concept factors and Achievement tests.

5. Both the stability of the teacher's functioning and the average level of functioning on Specific Affective Behaviors and Process Scales were important predictors of change but the relative importance of the two kinds of measures of teacher functioning varied with the kind of gain predicted and the grade level of the student.

6. The stability of the teacher's functioning in the Cognitive Behaviors was not an important predictor of change, but average level of functioning was.

7. Student gain (positive change) was positively related to the Classroom Functioning variables except F-7 and C-1 which were inversely related while F-6 was positively related for elementary students and inversely related for secondary students.

Specific findings from Study Number 15 included:

1. The effects of the Interpersonal Skills training for teachers was translated to student benefits in Years 02 and 03, but not in Year 01.

2. The student benefits seemed to be cumulative; that is, students did better in the second year of the two-year program than in the first year.

3. The differences between the treatment means on student outcome indices reflected the differences in the skills training which their teachers received.

4. The distribution among grade levels of significant differences in favor of Experimental groups reflected the differential response to Interpersonal Skills Training of elementary and secondary teachers.

5. The significant differences detected between the treatment groups on the Absenteeism variable support the findings of Study 14 that when teachers are using higher levels of interpersonal skills, students miss fewer days of school during the year.

6. The differences detected between the treatment means in Years 02 and 03 were not only statistically significant but were also meaningful in the real world.

The conclusion of the researchers from these two studies was that higher functioning teachers produce more gain in student measures of Self-Concept and Achievement and their students are absent fewer days. In fact, then, benefits do accrue to students when their teachers receive Interpersonal Skills Training.

Results Related to Model

Of the presage characteristics hypothesized as having an effect on learning interactions and/or student outcomes, only one was not supported. That is, the Race of the teacher did not seem to be an important contributor to the variation of Classroom Functioning. Both Prior Learning (as represented by pre-test scores) of the student and his I.Q. were important contributors to the variation of student outcomes; however, I.Q. was not as highly related to outcomes on Self-Concept tests as was pre-test score.

Subject Matter was the only one of the Contexts of Learning Interaction variables which did not have a significant effect on the variation of teacher and student behavior in learning interactions (Classroom Functioning Variables). Among the context variables, grade-level (as an organizational factor and/or as an effect of student age) was the greatest contributor to the variance within each time period but Time of Year was also an important contributor. The principal's contribution to the variation seemed to have much of the effect of a constant in a regression equation; i.e., he moved the mean of the school up or down on the vertical axis.

Learning Interaction (at least, as measured in these studies) was demonstrated to be both a dynamic and a curvilinearly inter-related process; i.e., teacher and student behaviors within the classroom were both interdependent and interactive. Further, it was demonstrated that student outcomes could be predicted from the Classroom Functioning variables.

Student Outcomes were demonstrated to be related directly to both student presage characteristics and to student and teacher behaviors in learning interactions (as measured by the Classroom Functioning variables). Further, it was demonstrated that manipulating the quality of the teacher's input to learning interactions affected both the student behaviors in the interactions and student outcomes.

Statistical Treatment

Before discussing the implications of these findings for practice and further research, it is perhaps worth noting that the results presented above represent a synthesis of the following analyses:

500 Sixth-Degree orthogonal polynomial multilinear regression analyses across time

150 Backward elimination multilinear regression analyses with quadratic terms yielding 150 two-variable and 150 three-variable response surfaces

89 Stepwise multilinear regression analyses

250 Analyses of co-variance (two-way)

311 Analyses of co-variance (one-way)

50 Analyses of variance (two-way)

20 Analyses of variance (one-way)

5 Chi-Square analyses

19 Kruskal-Wallis one-way analyses of variance by ranks

IMPLICATIONS FOR PRACTICE

The research results presented here strongly support several conclusions about educational practice:

1. It is worthwhile making sure that teachers use high levels of interpersonal skills in interaction with their students because (a) benefits accrue to the students in terms of increases on both mental health and cognitive indices and (2) the higher attendance rates of students whose teachers are functioning at higher levels mean increased financial support for the school in those states where state aid is based on ADA statistics.

2. It is worthwhile incorporating interpersonal skills as an important evaluative criteria for selecting principals and other local instructional leaders because of the effect their level of functioning has on the interpersonal skills used by teachers with their students.

3. Large numbers of teachers can be trained to increase their interpersonal skills.

4. The methodology used in this research can be adapted for use in personnel selection.

Items 1 and 2 above are self-evident on the basis of the research presented previously. Items 3 and 4 are amplified below.

Teacher Training

The project successfully demonstrated a training program to increase the interpersonal skills utilized by teachers. The program involved three elements (1) self-diagnosis of needed skills on the basis of training in measurement skills, (2) periodic feedback from professional coders using the instruments which the teachers had learned, and (3) training in Interpersonal Skills and their application within classroom learning interactions. The program went through several cycles of application and research. The most effective program (as finally developed) is described below.

Diagnosis: The teachers were taught the use of Flanders' Interaction Analysis Categories, the Cognitive Functioning Categories, and the Process Scales. They evaluated audio tape recordings of their instructional interactions and determined areas in which they needed skills improvement. Their self-diagnoses were supplemented with diagnoses by the NCHE trainers from the recordings coded by professional raters. On the basis of this diagnostic process, skills training modules were co-operatively (trainer with teachers) selected from the list of available modules for small groups of teachers. (When the teachers expressed a need for training in a skills area in which no module had yet been developed, the trainers either developed a module applying Interpersonal Skills to the area of need or brought in a supplementary consultant to supply the need. Thus, the modules "Planning for Learning" and "Working with Small Groups" and the series of modules, "Organizing for Learning, Parts I, II, III, and IV" were developed in direct response to trainees' expressed needs).

Feedback: The teachers were periodically supplied with feedback from professional raters as to their classroom functioning. (Individual ID number procedures were used to assure anonymity for the teacher's protection). Each teacher received (1) his individual scores, (2) the month's mean for his school, and (3) the month's mean for the school system for each of the Flanders' and Cognitive Categories and the Process Scales and (4) his individual Flanders' Matrix.

The trainer was supplied with group norms (for the teachers with whom he was working) as a guide to continuing training needs. A portion of each training session was set aside for discussing individual feedback with teachers who felt the need of such a conference.

The NCHE was gathering tape data on a monthly basis for research purposes so each Experimental teacher was supplied with feedback for each tape submitted. However, this is a relatively expensive process -- averaging about $5.00 per tape rated, including computer processing and feedback return. Subjective evaluations of trainer and trainees was that monthly feedback was not necessary. Their suggested schedule for feedback was (1) before entering training for diagnostic purposes, (2) about midway through training, and (3) at the end of training for evaluative purposes.

Skills Training: Skills training was standardized for purposes of analysis and replication through the use of standard training modules. The most effective format included the elements of (1) use of pre- and post- testing,

(2) a high proportion of experiential to didactic material, and (3) provision of "take-home" programs for application of skills in the trainees' classroom settings. The first portion of each training session was always a general discussion to share results of the "Practical Application" exercises from the last training session.

Although the trainees determined which modules they would receive, the trainer determined the sequence of modules based on an "Ideal Sequence" which incorporated all available modules. This sequence for the elementary school was:

Theoretical Overview

Flanders' Interaction Analysis

Developing Skills in Accepting Feelings

Scales for the Measurement of Interpersonal Processes

Cognitive Functioning Categories

Increasing Praise

Accepting Student Ideas

Questioning Skills, Parts I and II

Program for Increasing Student Involvement

Problem Solving Module

Program Development Skills

Planning for Learning

Organizing for Learning I: Teacher-Pupil Interaction

Organizing for Learning II: Responsive Physical Environment

Organizing for Learning III: Curriculum-Student Interaction

Organizing for Learning IV: Pupil-Task Interaction

Working with Small Groups

Consumatory Experience

The sequence for the secondary schools was similar. However, for the secondary schools the more directly Affective-related modules were delayed in presentation. Hence, the "Problem-Solving" and "Program Development Skills" were presented directly after the Flanders' Interaction Analysis and the Scales for the Measurement of Interpersonal Processes was not presented until after "Questioning Skills, Parts I and II."

The 18 modules represent about 30 hours total training time. However, no group of teachers ever received all 18 modules. The teachers who were in the program for two years received a total of 27 hours training and had the greatest gains. The Year 03 teachers (who had the second greatest gains) received about 16 hours training. All teachers, however, received a common nucleus of modules. This common nucleus consisted of the first nine modules listed in the Elementary sequence (above) plus the "Program Development Skills" module.

Enhancing Training Effectiveness: Subsequent to the results of Study Number 13 in which the teachers whose principal had had prior training in Interpersonal Skills were demonstrated to have made greater gains than the other experimental teachers in Year 03, the principal concerned was asked to recollect his activities related to the program. He stated that primarily they consisted of (1) using his own Interpersonal Skills with his teachers -- a statement supported by the available tape data in which he was one of the top functioning principals from the three years of the study, (2) expressing his own enthusiasm for the program, and (3) setting aside time in faculty meetings for talking with his teachers about the training, their feelings about the NCHE program, and the results of the training as they used the skills in their classrooms.

A second source of subjective evaluation which offers clues to enhancing the program is that of the trainers who compared their perceptions of the program during the first two years and the third year regarding the training schedule. In the first two years, the bulk of the training had been administered in the summer immediately prior to school opening and the rest of the training was scheduled at intervals of a month and a half or two months. (In year 01, the first training session following the pre-school training had been delayed until December because of start-up problems* with the project.) In Year 03, the pre-school

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*Funding was delayed. The cost of the pre-school training had been assumed by the researchers (and the school system had paid the participants' stipends) in order to get the project off the ground, but follow-up training could not be held until funds for teacher stipends were available.

workshop was shorter and the bulk of the training occurred during the school year at approximately one-month intervals (varied slightly according to the activity schedules of the individual schools).

The trainers felt that the shorter interval between training sessions was much better. In fact, they felt that even shorter intervals (of about two weeks) would probably be even better. They also stated that placing the bulk of the training within the school year was better as it allowed the trainees to use the "Practical Applications" in their classrooms after each session and bring the results of their skills practice with them to the next training session. Although the Peer Trainers who administered much of the training in Year 03 had not observed the Year 01 and 02 training, they, too, felt the shorter interval might be even better.

Suggested Program for Interpersonal Skills Training: On the basis of both the statistical analysis of the training conducted by the NCHE and the subjective evaluations of that program discussed above, the following procedures are suggested as the most effective program of Interpersonal Skills Training for large groups of teachers:

Step 1: Provide Interpersonal Skills Training for the principals (or other instructional leaders) of the schools to be involved. The training should include making and evaluating tape recordings of their functioning in their professional situations.

Step 2: At the same time, provide initial Interpersonal Skills Training for selected teachers from whom a core of Peer Trainers will be drawn.

Step 3: On the basis of training results and evaluation of post-training tapes of instructional activities of the teachers trained in Step #2, select teachers to be trained as Peer Trainers.

Step 4: Train the Peer Trainers in administering the program.

Step 5: Orient teachers to the training program and explain what will be involved. The Principal of each school should be involved in this orientation procedure.

Step 6: Have the teachers who will receive the training make a tape of their classroom interaction to be used for diagnostic purposes.

Step 7: Train teachers in the initial measurement modules and have them (1) evaluate their own tapes and (2) diagnose skill needs. Combine this with professional rating of their tapes, if possible, and if this is not too threatening to the teachers. (The degree of threat will depend on initial orientation to the program, on the arrangements for the professional rating -- who, where, what kind of identification procedures, etc. -- and on local trust relationships).

Step 8: Plan the skills training co-operatively with the teachers, selecting the skills modules to be used on the basis of their needs. One module that must always be selected is "Developing Skills in Accepting Feelings" as it is a pre-requisite to most of the other skills modules.

Step 9: Administer training modules at regular intervals of not longer than a month. In between the training sessions, the principal or other local instructional leader (trained in Interpersonal Skills) should provide time for discussing the program and its effects and for sharing results.

Step 10: Provide tape-data feedback about half-way through the program. (If professional rating is not available, teachers can rate their own tapes).

Step 11: Provide tape-data feedback at the end of the program for teacher self-evaluation.

Adapting the Methodology to Personnel Selection: The methodology for rating Interpersonal Skills was demonstrated to be a reliable measure of the functioning of both teachers and principals and the ratings obtained were shown to have significant relationships with selected outcome measures. It could be adapted to personnel selection very simply by requiring persons applying for positions within the school system to submit a one-hour tape of their professional functioning. This tape could then be coded and the data used in the selection procedure.

IMPLICATIONS FOR FURTHER RESEARCH

NCHE demonstrated (1) that Interpersonal Skills in the education setting are amenable to measurement and research, (2) that the selected technology works, and (3) that working within the specified model yielded significant and replicable results. The project also stimulated many questions for further research:

1. The version of Interpersonal Skills Training for Teachers used in the research project works. It might be possible to enhance it even further with careful study. Comparisons need to be made of gains with the enhanced program suggested above (p. 204f.) versus gains made under the previous versions of the program and in still other variations of intensity and sequence of training.

2. This research studied only the effects of training teachers in Interpersonal Skills applied to learning interactions. The gains demonstrated in student mental health indexes with this kind of program need to be compared with those of students under programs in which:

   a. Teachers are trained in a "Promotion of Mental Health Curriculum"* which they teach to their students,

   b. Teachers are trained in both Interpersonal Skills and a PMH Curriculum which they teach to their students,

   c. Interpersonal Skills are taught directly to students but not to their teachers,

   d. The PMH Curriculum is taught to students by teachers not trained in Interpersonal Skills, and, in addition, the Interpersonal Skills are taught directly to students (by other than their classroom teacher),

   e. The PMH Curriculum is taught to students by teachers trained in Interpersonal Skills and, in addition, the students are directly taught Interpersonal Skills.

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*For example, the Teacher Education Program in Social Causality developed from Dr. Ojemann's work with Education in Human Behavior and Potential and One to Grow On (NIMH).

The hypothesis of the researchers is that the greatest amount of gain on Student Mental Health Indices would be achieved by the students in condition "e".

3. This research was carried out with in-service teachers. The training program needs to be carried out in toto with pre-service teachers in a longitudinal study which will follow-up the trainees when they become in-service teachers and compare their functioning against the classroom functioning of 1st year teachers from traditional teacher education programs. It is the hypothesis of the researchers that such a program would result (1) in eventual levels of Interpersonal Skills functioning at or above the 4.0 level on the Process Scales and (2) reduce the rate of drop-out from the profession of the new, young teacher.

   This hypothesis is based on a serendipitous bit of anecedotal data: Three of the NCHE student raters (who knew the measurement devices) did their practice teaching in the Spring of 1974. Within the first two weeks of practice teaching, each of them, individually, came to the researchers for help "in reaching the students." The researchers gave them a crash course in Interpersonal Skills applied to teaching and requested tapes of their classroom functioning. During the final week of their student teaching, they were averaging about 3.6 on the Process Scales with comparable functioning in the Flanders' and Cognitive categories.

4. One important project that needs to be undertaken is an investigation of the causative origins of the deteriorative trend across time from September till May that was detected in the Control Group Data. The current researchers hypothesize that it is related to physical functioning of the teachers. The problem could be approached through gathering periodic (1) physiological and physical functioning data and (2) classroom functioning data.

5. The causative origins of the grade-level differences detected in the data need to be investigated.

6. The study involving the effects of prior training of instructional leaders needs to be replicated with a larger sample.

7. Student response to the Classroom Functioning variables needs to be analyzed by student presage characteristics of age, I.Q., prior learning, race, and sex.

8. The relationship of Classroom Functioning variables with Student Outcomes (particularly Absenteeism) needs to be investigated using clinical research procedures to follow individuals through "chain of effect" relationships.

IMPLICATIONS BEYOND THE EDUCATIONAL CONTEXT

Because of the size and the nature of the sample involved in the research, it is possible to draw some implications to contexts in addition to that of education. These implications have to do with wider applications of Interpersonal Skills Training to the population in general and to leadership personnel in particular. They are presented below in syllogistic form.

Syllogism I:

IF (1) a sample of 5,000 students from two states and comprising members from 3 ethnic groups can be considered an adequate sample of the general run of the child population,

AND (2) it has been demonstrated that raising the levels of interpersonal skills of the adults (teachers) with whom they interact causes mental health and cognitive benefits to accrue to those students,

THEN (3) it can be concluded that it would be worthwhile to raise levels of interpersonal skills on a widespread basis among the general population with whom children have frequent contacts, particularly the parent population.*

Syllogism II:

IF (1) a sample of 300 teachers from two states and two races can be considered an adequate sample of the general run of the population,

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*In line with Syllogism I, the current researchers have developed and are pilot testing Interpersonal Skills Training for Parents.

AND (2) it has been demonstrated that that sample can be trained to increase their levels of Interpersonal Functioning,

THEN (3) it can be concluded that properly conducted Interpersonal Skills training can effectively increase the level of functioning of the population in general.

The qualifier "properly conducted" is inserted to ensure that consideration is given to the need to adapt the application modules when Interpersonal Skills Training is transferred from context to context.

The three studies which dealt with the effects of the principal on the functioning of the teachers in his school stimulated some conclusions about leadership and/or managerial functioning in relation to Interpersonal Skills Training. These conclusions are embodied in Syllogisms III, IV, and V.

Syllogism III:

IF (1) the principal/teacher relationship can be considered a status-leader/follower or manager/employee relationship,

AND (2) it has been demonstrated that, in a largely self-contained work situation (one adult and some young people in a single room), the teacher can be strongly enough affected by the principal's Interpersonal Functioning that (a) his own work behavior can be predicted by the level of the principal's and (b) his reports of the attractiveness of his working environment and professional tasks can be significantly differentiated according to who his principal is,

AND (3) the process of influence is a person-to-person interaction,

THEN (4) one should anticipate even stronger effects of the leader's functioning in the more common situations where contact between the leader/manager and his follower/employees is more interactive and more continuous.

Syllogism IV:

IF (1) the effect of training the principal/leader/manager in Interpersonal Skills is to enhance the response of his teachers/followers/employees to similar training,

AND (2) it is desireable to raise the levels of Interpersonal Skills for large numbers of the population,

THEN (3) the place to begin is with Interpersonal Skills Training at the status-leader/managerial level.

Syllogism V:

IF (1) it is desireable that the population in general utilize high levels of Interpersonal Skills in their daily person-to-person functioning on a wide-spread basis,

AND (2) it has been demonstrated that the teacher/follower/worker with a high functioning principal/status-leader/manager uses increased levels of these skills,

THEN (3) the principal/status-leader/manager should (a) be selected for leadership position on the basis of his levels of Interpersonal Functioning as well as on other job-related criteria and (b) should be held accountable for exercising those skills in his day-to-day functioning.

The above syllogisms are far-reaching in their effect and a few years ago would have been purely pie-in-the-sky dreaming, but not today. The technology for putting the pie on the table is now available. Both training and accountability tools have been developed in the last few years. The "Open Society" is a possibility, today. Tomorrow, it could be made a reality.

APPENDIX

FLANDERS' CATEGORIES FOR INTERACTION ANALYSIS*

Teacher Talk	Indirect Influence	1. Accepts Feelings: Accepts and clarifies the feeling tone of the students in a non-threatening manner. Feelings may be positive or negative. Predicting or recalling feelings are included. 2. Praises or Encourages: Praises or encourages student action or behavior. Jokes that release tension, not at the expense of another individual, nodding head or saying, "um hm?" or "go on" are included. 3. Accepts or Uses Ideas of Student: Clarifying, building, or developing ideas suggested by a student. As teacher brings more of his own ideas into play, shift to Category 5. 4. Asks Questions: Asking a question about content or procedure with the intent that a student answer.
	Direct Influence	5. Lecturing: Giving facts or opinions about content or procedure; expressing his own ideas; asking rhetorical questions. 6. Giving Directions: Directions, commands, or orders to which a student is expected to comply. 7. Criticizing or Justifying Authority: Statements intended to change student behavior from non-acceptable pattern; bawling someone out; stating why the teacher is doing what he is doing; extreme self-reference.
Student Talk		8. Student Talk: Response; talk by students in response to teacher. Teacher initiates the contact or solicits student statement. 9. Student Talk: Initiation; talk by students which they initiate. If "calling on" student is only to indicate who may talk next, observer must decide whether student wanted to talk. If he did, use this category.
		10. Silence or confusion: Pauses, short periods of silence and periods of confusion in which communication cannot be understood by the observer.

*Minnesota, 1959, by Dr. Ned A. Flanders.

COGNITIVE FUNCTIONING CATEGORIES

PERSON		CATEGORY OF BEHAVIOR
TEACHER	Memory	1. Demonstrates knowledge of a fact (Memory or recall and recognition). 2. Solicits student to demonstrate knowledge of a fact.
	Thinking	3. Uses a fact (thinking) Examples: (a) to solve a problem propose an attack on problem (b) to analyze a situation 4. Solicits student to use a fact (thinking) Examples: (a) to solve a problem (b) to analyze a situation
STUDENT	Memory	5. Demonstrates knowledge of a fact (Memory or recall). 6. Solicits someone else to demonstrate knowledge of a fact.
	Thinking	7. Uses a fact (Thinking) Examples: (a) to solve a problem (b) to analyze a situation 8. Solicits someone else to use a fact Examples: (a) to solve a problem (b) to analyze a situation
		9. Affective behavior 10. Silence or confusion

A SCALE FOR THE MEASUREMENT OF A TEACHER'S UNDERSTANDING OF THE MEANING OF CLASSROOM EXPERIENCES FOR HER STUDENTS

Level 1. Neither the tone quality nor the words of the teacher's verbal communication conveys any feelings, and/or she responds inaccurately to the meaning of the students' experiences.
Examples:
(1) The tone of the teacher's voice is flat or monotonous.
(2) The teacher says, "You enjoyed that" after a student's performance indicating obvious dislike for the activity.

Level 2. The tone quality of the teacher's verbal communication conveys slight evidence of feelings which are only somewhat appropriate to her students' experiences. She uses no words to explicate her feelings.
Examples:
(1) The teacher's voice is very subdued and controlled.
(2) The teacher says, "Let's hold it down" after a student expresses joy with the activity.

Level 3. The tone quality of the teacher's verbal communication conveys feelings which are quite appropriate to her students' experiences. She is "with" her students. However, she uses no words to explicate her feelings.
Examples:
(1) The teacher's voice matches that of her students. She neither adds nor detracts from the meaning of their experiences.
(2) The teacher says, "Good" after a student demonstrates appropriate joy with the activity.

Level 4. The tone quality of the teacher's verbal communication conveys feelings which are appropriate to her students' experiences. Additionally, she uses mild words to describe the feelings.
Examples:
(1) The teacher adds slightly to the meaning of the students' experiences by appropriate words.
(2) The teacher says, "Good, you seemed really to enjoy that!" after a student demonstrates appropriate joy with the activity.

Level 5. The tone quality of the teacher's verbal communication conveys feelings which are appropriate to her students' experiences. Additionally, she uses "strong" words to describe her feelings.

Examples:

(1) The teacher adds a great deal to the meaning of the students' experiences by appropriate words.

(2) The teacher says, "Great, I felt like you were going to dance you liked that so much!" after a student demonstrates appropriate joy with the activity.

A SCALE FOR THE MEASUREMENT OF A TEACHER'S GENUINENESS
IN HER CLASSROOM INTERACTION WITH STUDENTS

Level 1. All of the teacher's verbal communications are ritualistic. They seem to be mechanical or practiced.
Examples:
(1) The teacher sounds like a "school teacher." ("teacherish voice").
(2) The teacher slowly and/or mechanically says, "Turn to page 99 and begin reading silently."

Level 2. Most of the teacher's verbal communications are ritualistic, but a few are somewhat spontaneous.
Examples:
(1) The teacher sounds like a "school teacher" most of the time, but occasionally she sounds like she is having a "normal" conversation.
(2) The teacher rather slowly says, "Turn to page 99 and begin reading silently," but she gives evidence of some (though not much) vitality.

Level 3. The teacher's verbal communications are about equally distributed between ritualistic and spontaneous.
Examples:
(1) The teacher sounds like a "school teacher," about half the time, while for the other half she seems to be having a "normal conversation."
(2) The teacher says, "Let's turn to page 99 and begin reading," and she gives evidence of normal vitality. She is neither wildly enthusiastic nor dull.

Level 4. Most of the teacher's verbal communications are spontaneous, but a few are ritualistic.
Examples:
(1) The teacher only rarely sounds like a "school teacher." Most of the time she sounds as though she is engaging in "normal" conversation.
(2) The teacher says, "Let's turn to page 99, and would anyone like to read to us?"

Level 5. All of the teacher's verbal communications are spontaneous. They are neither mechanical nor practiced.
Examples:
(1) The teacher always sounds like she is having "normal" conversation.
(2) The teacher says, "What do you want to read today? Does anyone know an exciting story?"

A SCALE FOR THE MEASUREMENT OF THE PROCESS OF SUCCESS PROMOTION

Level 1. The teacher's verbal behavior is directed exclusively toward accomplishing her goals without regard to those of her students.
Examples:
(1) The teacher ignores students' questions.
(2) The teacher punishes student behavior which she deems is away from the lesson. She seems to pursue her pre-established schedule rigidly.

Level 2. The teacher's behavior is directed primarily toward accomplishing her goals, but occassionally she acts to help students achieve their self-directed goals.
Examples:
(1) The teacher responds to a few student questions, but ignores most of them.
(2) The teacher occasionally allows a student to discuss something "off the subject." She seems very aware of being-in-charge of the group and of covering a prescribed amount of the material.

Level 3. The teacher's verbal behavior is directed toward accomplishing her goals about 50% of the time and the students' self-directed goals about 50% of the time.
Examples:
(1) The teacher responds to about half of the students' questions.
(2) The teacher gets "off the subject" about 50% of the time in the sense that she enters into a dialogue with students. She seems to feel in charge of a group and concerned about covering a prescribed amount of material. However, she does not seem anxious about it.

Level 4. The teacher's verbal behavior is directed primarily toward helping her students accomplish their self-directed goals without undue regard to her own goals.
Examples:
(1) The teacher responds to most of the students' questions.
(2) The teacher "gets off the subject" easily. In fact, she seems to enjoy doing so and sustains it by accepting a large number of student-initiated statements. She gives only slight evidence of either being in charge or being limited by the amount of material to be covered.

Level 5. All of the teacher's verbal behavior is directed toward helping the students accomplish their self-selected goals without regard to her own goals.
Examples:

(1) The teacher's approach is geared to cope with all the students' questions as they state them.

(2) The teacher's subject matter consists solely of the process of helping students accomplish their goals. She dialogues with them freely and openly without any evidence of being limited either by concerns about being in charge or by the amount of material to be covered.

A SCALE FOR THE MEASUREMENT OF THE RESPECT PROVIDED BY THE TEACHER IN CLASSROOM INTERACTION

Level 1. The teacher communicates a clearly negative regard for the students' individual abilities to learn.
Examples:
(1) The teacher structures the situation so the student takes little or no active part in the learning process; i.e., lectures or gives unnecessarily detailed, repetitive directions, etc.
(2) The teacher seems to mean it when she says, "I don't expect you to learn this. It's goo difficult for you."

Level 2. The teacher communicates a somewhat negative regard for the students' individual abilities to operate effectively in learning situations involving memory and recognition (level 1 of Bloom's Taxonomy, 1967).
Examples:
(1) The teacher structures the learning situation so that the student can appropriately respond only by rote, but often fails to allow enough time for even that response, i.e., answers own questions or calls for "help" with the answer. The teacher communicates doubt that the students will be able to participate "correctly."
(2) The teacher says, "Even this is too difficult for many of you."

Level 3. The teacher consistently communicates a positive regard for the students' individual abilities to operate effectively in learning situations involving memory and recognition (level 1 of Bloom's Taxonomy), but not with the higher intellective processes; i.e., creativity, problem-solving, judgment.
Examples:
(1) The teacher structures the situation in such a manner that the students are expected and encouraged to respond at level 1 of the cognitive processes, but responses at higher levels are not appropriate.
(2) The teacher says, "I'll do the thinking. You pay attention and learn."

Level 4. The teacher consistently communicates a positive regard for the students' abilities to operate effectively in learning situations involving memory and recognition (level 1 of Bloom's Taxonomy), and occasionally allows the students to explore the higher intellective processes.

Examples:

(1) The teacher sometimes structures the situation so that she expects responses at higher levels. They are considered appropriate and are received by the teacher as worthwhile contributions to the learning process.

(2) The teacher says, "Let's not strain our brains, but take time to think of some new ways to do that."

Level 5. The teacher consistently communicates a positive regard for the students' abilities to operate effectively at all intellective levels.

Examples:

(1) The teacher structues the learning situations so that she expects responses at higher levels. They are always appropriate and encouraged. Such responses are received by the teacher as worthwhile contributions to the learning process.

(2) The teacher says, "I'll bet we can think of a hundred new ways to do that."

A SCALE FOR THE MEASURE OF STUDENT INVOLVEMENT

Level 1. The student(s) is not involved in the classroom activity prescribed by the teacher.
Examples:
(1) He expresses a strong dissatisfaction with the present activity.
(2) He makes a remark unrelated to present activity.

Level 2. The student(s) participates about half of the time in the activity prescribed by the teacher.
Examples:
(1) He makes a response to the activity and follows it by one unrelated to it.
(2) He expresses mild dissatisfaction with the present activity.

Level 3. The student(s) participates in the class activity, but only within the prescribed rules.
Examples:
(1) All his responses are related to the class activity, but he seems merely to be going along with the game.
(2) He expresses neither satisfaction nor dissatisfaction with the activity.

Level 4. The student(s) participates enthusiastically in the class activity, but sticks pretty much to the rules established by the teacher.
Examples:
(1) All his responses are related to the class activity, and he seems to enjoy it.
(2) He expresses mild satisfaction with the activity.

Level 5. The student(s) participates enthusiastically in the class activity and goes beyond the rules established by the teacher.
Examples:
(1) All his responses are related to the class activity, and his enthusiasm is reflected in his exploration of new ideas stemming from it.
(2) He expresses strong satisfaction with the activity.

CLASSROOM CLIMATE SEMANTIC DIFFERENTIAL*

Notice: The identity of persons responding to this questionnaire will not be revealed to anyone. Completion time is 20 minutes.

Study of the Concepts Involved in Educational Processes

We would like to know what certain concepts involved in the educational process mean to you. We are using a novel way to give people an opportunity to express the feelings they have about pertinent things. It consists of a number of words naming concepts involved in the educational process and a number of evaluation scales.

On each scale you can indicate the direction and intensity of your association for a given concept by placing an X in an appropriate space.

Here is an example:

PRE-SCHOOL PLANNING ACTIVITIES

1. Good:___:___:___:___:___:___:___:Bad

If your association is that pre-school planning activities in your school are extremely good, you would mark as follows:

1. Good: X :___:___:___:___:___:___:Bad

If you feel they are somewhat bad, you would mark:

1. Good:___:___:___:___:___: X :___:Bad

If you feel that they are neither good nor bad (or both good and bad), you would mark:

1. Good:___:___:___: X :___:___:___:Bad

Please give your first reaction; work quickly. It shouldn't take more than two minutes to finish a page.

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*Southeastern Educational Development Laboratory, 1969

SEMANTIC DIFFERENTIAL

Date: _____ Teacher ID No: _____

Score

I. YOUR PRESENT SCHOOL SITUATION

1. Good:___:___:___:___:___:___:___:Bad
2. Unpleasant:___:___:___:___:___:___:___:Pleasant
3. Nice:___:___:___:___:___:___:___:Awful
4. Unfair:___:___:___:___:___:___:___:Fair
5. Worthless:___:___:___:___:___:___:___:Valuable
6. Sweet:___:___:___:___:___:___:___:Bitter
7. Sad:___:___:___:___:___:___:___:Happy
8. Kind:___:___:___:___:___:___:___:Cruel

II. TEACHING EDUCATIONALLY DISADVANTAGED STUDENTS

1. Pleasant:___:___:___:___:___:___:___:Unpleasant
2. Awful:___:___:___:___:___:___:___:Nice
3. Fair:___:___:___:___:___:___:___:Unfair
4. Bitter:___:___:___:___:___:___:___:Sweet
5. Happy:___:___:___:___:___:___:___:Sad
6. Valuable:___:___:___:___:___:___:___:Worthless
7. Cruel:___:___:___:___:___:___:___:Kind
8. Bad:___:___:___:___:___:___:___:Good

Score

III. LEADERSHIP AND SERVICES PROVIDED BY SCHOOL SYSTEM **CENTRAL** OFFICE STAFF

1. Nice:___:___:___:___:___:___:___:Awful
2. Unfair:___:___:___:___:___:___:___:Fair
3. Worthless:___:___:___:___:___:___:___:Valuable
4. Sweet:___:___:___:___:___:___:___:Bitter
5. Sad:___:___:___:___:___:___:___:Happy
6. Kind:___:___:___:___:___:___:___:Cruel
7. Good:___:___:___:___:___:___:___:Bad
8. Unpleasant:___:___:___:___:___:___:___:Pleasant

IV. FACULTY GROUP PLANNING ACTIVITIES

1. Unfair:___:___:___:___:___:___:___:Fair
2. Worthless:___:___:___:___:___:___:___:Valuable
3. Bitter:___:___:___:___:___:___:___:Sweet
4. Sad:___:___:___:___:___:___:___:Happy
5. Cruel:___:___:___:___:___:___:___:Kind
6. Bad:___:___:___:___:___:___:___:Good
7. Unpleasant:___:___:___:___:___:___:___:Pleasant
8. Awful:___:___:___:___:___:___:___:Nice

Score

V. EDUCATIONAL CHANGE THROUGH INNOVATION

1. Good:___:___:___:___:___:___:___:Bad
2. Nice:___:___:___:___:___:___:___:Awful
3. Valuable:___:___:___:___:___:___:___:Worthless
4. Happy:___:___:___:___:___:___:___:Sad
5. Unpleasant:___:___:___:___:___:___:___:Pleasant
6. Unfair:___:___:___:___:___:___:___:Fair
7. Bitter:___:___:___:___:___:___:___:Sweet
8. Cruel:___:___:___:___:___:___:___:Kind

VI. EVALUATION OF EDUCATIONAL PRACTICES

1. Bad:___:___:___:___:___:___:___:Good
2. Unpleasant:___:___:___:___:___:___:___:Pleasant
3. Awful:___:___:___:___:___:___:___:Nice
4. Fair:___:___:___:___:___:___:___:Unfair
5. Wortnless:___:___:___:___:___:___:___:Valuable
6. Bitter:___:___:___:___:___:___:___:Sweet
7. Sad:___:___:___:___:___:___:___:Happy
8. Kind:___:___:___:___:___:___:___:Cruel

Score

VII. INSERVICE TRAINING ACTIVITIES

1. Good:___:___:___:___:___:___:___:Bad
2. Awful:___:___:___:___:___:___:___:Nice
3. Worthless:___:___:___:___:___:___:___:Valuable
4. Happy:___:___:___:___:___:___:___:Sad
5. Pleasant:___:___:___:___:___:___:___:Unpleasant
6. Unfair:___:___:___:___:___:___:___:Fair
7. Bitter:___:___:___:___:___:___:___:Sweet
8. Cruel:___:___:___:___:___:___:___:Kind

VIII. PARENT INTEREST AND COOPERATION

1. Happy:___:___:___:___:___:___:___:Sad
2. Cruel:___:___:___:___:___:___:___:Kind
3. Awful:___:___:___:___:___:___:___:Nice
4. Fair:___:___:___:___:___:___:___:Unfair
5. Valuable:___:___:___:___:___:___:___:Worthless
6. Bad:___:___:___:___:___:___:___:Good
7. Pleasant:___:___:___:___:___:___:___:Unpleasant
8. Bitter:___:___:___:___:___:___:___:Sweet

Score

IX. INDIVIDUALIZED INSTRUCTION

1. Good:___:___:___:___:___:___:___:Bad
2. Sad:___:___:___:___:___:___:___:Happy
3. Nice:___:___:___:___:___:___:___:Awful
4. Bitter:___:___:___:___:___:___:___:Sweet
5. Fair:___:___:___:___:___:___:___:Unfair
6. Worthless:___:___:___:___:___:___:___:Valuable
7. Pleasant:___:___:___:___:___:___:___:Unpleasant
8. Cruel:___:___:___:___:___:___:___:Kind

X. THE NONGRADED ORGANIZATIONAL STRUCTURE

1. Fair:___:___:___:___:___:___:___:Unfair
2. Worthless:___:___:___:___:___:___:___:Valuable
3. Nice:___:___:___:___:___:___:___:Awful
4. Bitter:___:___:___:___:___:___:___:Sweet
5. Happy:___:___:___:___:___:___:___:Sad
6. Pleasant:___:___:___:___:___:___:___:Unpleasant
7. Bad:___:___:___:___:___:___:___:Good
8. Cruel:___:___:___:___:___:___:___:Kind

Score

XI. THE GRADED ORGANIZATIONAL STRUCTURE

1. Happy:___:___:___:___:___:___:___:Sad
2. Sweet:___:___:___:___:___:___:___:Bitter
3. Worthless:___:___:___:___:___:___:___:Valuable
4. Unfair:___:___:___:___:___:___:___:Fair
5. Nice:___:___:___:___:___:___:___:Awful
6. Unpleasant:___:___:___:___:___:___:___:Pleasant
7. Good:___:___:___:___:___:___:___:Bad
8. Kind:___:___:___:___:___:___:___:Cruel

XII. INSTRUCTIONAL EMPHASIS UPON PUPIL SELF-CONCEIT

1. Bad:___:___:___:___:___:___:___:Good
2. Bitter:___:___:___:___:___:___:___:Sweet
3. Unpleasant:___:___:___:___:___:___:___:Pleasant
4. Nice:___:___:___:___:___:___:___:Awful
5. Fair:___:___:___:___:___:___:___:Unfair
6. Worthless:___:___:___:___:___:___:___:Valuable
7. Happy:___:___:___:___:___:___:___:Sad
8. Kind:___:___:___:___:___:___:___:Cruel

Score

XIII. YOUR FELLOW FACULTY MEMBERS

1. Kind:___:___:___:___:___:___:___:Cruel
2. Bad:___:___:___:___:___:___:___:Good
3. Happy:___:___:___:___:___:___:___:Sad
4. Unpleasant:___:___:___:___:___:___:___:Pleasant
5. Bitter:___:___:___:___:___:___:___:Sweet
6. Nice:___:___:___:___:___:___:___:Awful
7. Worthless:___:___:___:___:___:___:___:Valuable
8. Unfair:___:___:___:___:___:___:___:Fair

XIV. YOUR SCHOOL PHILOSOPHY CONCERNING PUBLIC SCHOOL EDUCATION

1. Good:___:___:___:___:___:___:___:Bad
2. Unpleasant:___:___:___:___:___:___:___:Pleasant
3. Nice:___:___:___:___:___:___:___:Awful
4. Unfair:___:___:___:___:___:___:___:Fair
5. Worthless:___:___:___:___:___:___:___:Valuable
6. Sweet:___:___:___:___:___:___:___:Bitter
7. Sad:___:___:___:___:___:___:___:Happy
8. Kind:___:___:___:___:___:___:___:Cruel

Score

XV. ACTION RESEARCH PROJECTS

1. Bad:___:___:___:___:___:___:___:Good
2. Unpleasant:___:___:___:___:___:___:___:Pleasant
3. Awful:___:___:___:___:___:___:___:Nice
4. Fair:___:___:___:___:___:___:___:Unfair
5. Worthless:___:___:___:___:___:___:___:Valuable
6. Bitter:___:___:___:___:___:___:___:Sweet
7. Sad:___:___:___:___:___:___:___:Happy
8. Kind:___:___:___:___:___:___:___:Cruel

XVI. SCHOOL-COMMUNITY RELATIONSHIPS

1. Good:___:___:___:___:___:___:___:Bad
2. Awful:___:___:___:___:___:___:___:Nice
3. Worthless:___:___:___:___:___:___:___:Valuable
4. Happy:___:___:___:___:___:___:___:Sad
5. Pleasant:___:___:___:___:___:___:___:Unpleasant
6. Unfair:___:___:___:___:___:___:___:Fair
7. Bitter:___:___:___:___:___:___:___:Sweet
8. Cruel:___:___:___:___:___:___:___:Kind

Score

XVII. LOCAL SCHOOL LEADERSHIP

1. Nice:___:___:___:___:___:___:___:Awful
2. Unfair:___:___:___:___:___:___:___:Fair
3. Worthless:___:___:___:___:___:___:___:Valuable
4. Sweet:___:___:___:___:___:___:___:Bitter
5. Sad:___:___:___:___:___:___:___:Happy
6. Kind:___:___:___:___:___:___:___:Cruel
7. Good:___:___:___:___:___:___:___:Bad
8. Unpleasant:___:___:___:___:___:___:___:Pleasant